Exhibit VGS-AG-004

STATE OF VERMONT
PUBLIC UTILITY COMMISSION

Case No. 17-3550-INV

Investigation pursuant to 30 V.S.A. §§ 30 and 209 regarding the alleged failure of Vermont Gas Systems, Inc. to comply with the certificate of public good in Docket 7970 by burying the pipeline at less than required depth in New Haven, Vermont	Evidentiary hearing conducted September 1-3, 2020

Case No. 18-0395-PET

Notice of Probable Violations of Vermont Gas Systems, Inc. for certain aspects of the construction of the Addison natural gas pipeline	

Order entered: 01/29/2021

ORDER RE: LIABILITY AND

LIFTING OF STAY OF PROCEEDINGS IN CASE NO. 18-0385-PET

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I. INTRODUCTION

This Order is not a final judgment. It is an interim ruling on a question of law that was necessary to advance this case to its conclusion.[1] In this Order I determine that Vermont Gas Systems, Inc. ("Vermont Gas" or the "Company") violated the final order and certificate of public good issued in Docket 7970, which authorized the construction of the Addison natural gas pipeline.[2] This Order is a product of the first part of the bifurcated process previously set out for the parties in this case.[3] This order is not a proposal for decision. This Order is also not a final judgment, and the parties may request that I reconsider my conclusions or that the Vermont Public Utility Commission ("Commission")[4] conduct an interlocutory review of this Order.

The second part of this bifurcated proceeding is the penalty phase, during which the parties will address the bases for any appropriate penalty for the violations documented in this order, using the criteria in 30 V.S.A. § 30. After the penalty phase, I will issue a proposal for decision for the Commission's consideration that both sets forth a recommended penalty amount and incorporates the findings and conclusions of this Order. The parties will then have a second

[1] *See Investigation into Meteorological Tower at 700 Kidder Hill Road in Irasburg, Vermont*, Docket 8585, Order of 11/06/19 at 2-3 citing 30 V.S.A. § 8(a) (a hearing officer "may inquire into and examine any matter within the jurisdiction of the Commission").

[2] *Petition of Vermont Gas Systems, Inc. for a certificate of public good authorizing the construction of the "Addison Natural Gas Project,"* Docket 7970, Order of 12/23/13.

[3] Tr. 9.1.20 at 24 (Tousley).

[4] Pursuant to Section 9 of Act 53 of the 2017 legislative session, the Vermont Public Service Board's name was changed to the Vermont Public Utility Commission, effective July 1, 2017. For clarity, activities of the Vermont Public Service Board that occurred before the name change will be referred to in Commission documents as activities of the Commission unless that would be confusing in the specific context.

opportunity to comment on this Order by filing comments and presenting oral arguments to the Commission on the proposal for decision, consistent with the requirements of 30 V.S.A. § 8 and 3 V.S.A. § 811. Final judgment will then be rendered in this case by a majority of the Commission.

On December 23, 2013, Commission issued a final order (the "2013 Final Order") and certificate of public good ("CPG") in Docket 7970, in which the Commission authorized Vermont Gas to construct a natural gas transmission pipeline from Chittenden County into Addison County, Vermont (the "Project"). In the 2013 Final Order and CPG, in response to testimony from Vermont Gas, the Commission set high standards for Vermont Gas to meet in constructing and operating the Project, including the following standard for public health and safety:

> [O]ur assessment of the safety and health complication of the Project is further supported by the fact that the Project complies with, and in many circumstances surpasses, applicable safety codes. The evidence shows that the Project will be built to meet or exceed the federal Pipeline Safety Code, as well as all applicable safety standards set forth by various third-party organizations. Vermont Gas's demonstrated commitment to these design, construction, operation, and maintenance standards ensure there will be no undue adverse impact from the Project on safety or public health.[5]

On July 14, 2017, the Commission initiated an investigation in Case No. 17-3550-INV, pursuant to 30 V.S.A. §§ 30 and 209, into whether the Company violated the 2013 Final Order and CPG by burying the pipeline at less than four feet at 18 locations in New Haven, Vermont, in violation of the 2013 Final Order, CPG, and the memorandum of understanding ("MOU") between Vermont Gas and Vermont Transco LLC/Vermont Electric Power Company, Inc. ("VELCO").

On February 16, 2018, the Vermont Department of Public Service (the "Department") filed a Notice of Probable Violation ("NOPV") with the Commission for violations of pipeline safety regulations alleged to have been committed by Vermont Gas during the construction of the Project. Specifically, the Department alleged that Vermont Gas was in violation of 49 C.F.R. Part 192 for installing the pipeline directly on the trench bottom without proper support and

[5] 2013 Final Order at 92.

failing to install trench breakers per the construction plan details prior to backfilling the trench. In response to the Department's filing, the Commission initiated Case No. 18-0395-PET.[6]

On March 27, 2018, Vermont Gas and the Department filed a stipulation proposing a resolution of the NOPV in Case No. 18-0395-PET.

On April 4, 2018, the Commission issued an indefinite stay of Case No. 18-0395-PET to allow for the independent investigation of the Department's allegations by the independent third-party expert who was previously hired to assist in the investigation in Case No. 17-3550-INV. This stay is lifted and the factual bases for the NOPV are addressed in this Order.

On April 5, 2018, I notified the parties that the Commission had broadened the scope of the investigation to include a thorough review of the construction, performance, and safety of the pipeline.

In today's Order I lift the stay on the proceedings in Case No. 18-0395-PET and merge its proceedings with those in Case No. 17-3550-INV.

I find that Vermont Gas violated the 2013 Final Order, CPG, and Commission Rule 5.408 by failing to:

(1) bury the pipeline using the burial methods approved in the 2013 Final Order and CPG;

(2) achieve the four-foot depth-of-cover standard required at 18 locations in Clay Plains Swamp;

(3) conform to its own specifications regarding pipeline burial on the trench bottom and installation of trench breakers;[7]

(4) comply with the compaction requirements for the pipeline in its construction specifications; and,

(5) ensure that staffing for the Project included a licensed professional engineer that served as the responsible charge engineer for the Project.

Each of these actions by Vermont Gas constituted a substantial change to the Project for which Vermont Gas was required to seek and receive Commission approval. Vermont Gas's failure to seek and receive that approval before making each of these changes constitutes a

[6] *Notice of Probable Violations for certain aspects of the construction of the Addison Natural Gas Project*; Case No. 18-0395-PET, filed March 27, 2018.

[7] This finding responds to the Department's allegations in Case No. 18-0395-PET.

separate violation of the 2013 Final Order, the CPG, and Rule 5.408. I discuss each violation separately, below.

I also find that Vermont Gas is in violation of the 2013 Final Order and CPG for an unapproved material deviation from the approved Project plans when it failed to bury the pipeline seven feet below non-jurisdictional streams.

Vermont Gas failed to obtain advance approval from the Commission for either the material deviation from the approved plans or the substantial changes to the Project. The evidence in this case demonstrates that Vermont Gas did not inform the Commission that it had used the unapproved sink-in-the-swamp method to install the pipeline at less than the required depth in the Clay Plains Swamp in New Haven until nine months after the fact. The evidence gathered in this investigation also informs the Commission about other alleged unapproved deviations from the plans and evidence submitted in Docket 7970.

Vermont Gas gave no advance notice of its plans nor did it seek approval of these changes before they occurred. This prevented any analysis of those changes by the Commission and denied the public an opportunity to comment on the changes. To the extent the allegations are supported by the evidence, Vermont Gas violated the 2013 Final Order and CPG, and for the unapproved substantial changes, Commission Rule 5.408. Given that circumstance, Vermont Gas may be assessed a penalty pursuant to 30 V.S.A. §§ 30 and 247.

Lastly, I find that Vermont Gas did not violate the 2013 Final Order and CPG for allegedly failing to:

(1) install corrosion protection;
(2) use proper backfill;
(3) meet a three-foot depth-of-cover generally and a four-foot depth-of-cover requirement for installing the pipeline in residential areas; and
(4) implement a quality assurance plan during its construction of the pipeline.

I do not find Vermont Gas liable for these alleged failures either because they are not factually supported or because any deviation from what Vermont Gas represented would happen that is supported by the facts does not amount to a material deviation or a substantial change to what was approved by the Commission.

As part of today's order, I direct the parties to submit scheduling proposals for additional proceedings to: (1) determine an appropriate civil penalty to be imposed on Vermont Gas; (2)

address whether additional remedies are appropriate; and (3) determine whether the proposed stipulation in Case No. 18-0395-PET should be accepted. These issues will be addressed in a proposal for decision to the Commission to be issued as part of the penalty phase of this proceeding.

II. BACKGROUND

On December 12, 2012, Vermont Gas filed the petition in Docket 7970.

On December 23, 2013, the Commission issued the Final Order and CPG in Docket 7970.

From September 12 to September 22, 2016, Vermont Gas installed 2,500 feet of pipeline in the Clay Plains Swamp in New Haven, Vermont, using a "sink-in-the-swamp" installation method. This installation method was photographed and videotaped by Laurence Shelton. With Kristin Lyons, Nathan and Jane Palmer, and Rachel Smolker, Mr. Shelton is one of the intervenors ("Intervenors") in this proceeding.

On June 2, 2017, Vermont Gas filed a sixth non-substantial change request in Docket 7970.[8] Vermont Gas reported that it had not buried the pipeline to the required depth of four feet at 18 locations along a 2,500-foot length of the pipeline in the VELCO right-of-way in the Clay Plains Swamp in New Haven, Vermont. Vermont Gas asserted that this was a "minor" and "non-substantial" change that would not have a significant impact on the Section 248 criteria and therefore would not require an amendment to the CPG issued in Docket 7970.

On July 14, 2017, rather than issuing the requested non-substantial change determination, the Commission opened Case No. 17-3550-INV, an investigation to determine whether Vermont Gas violated the 2013 Final Order and CPG by burying the pipeline to less than four feet in the VELCO right-of-way in New Haven, Vermont. The Commission also required the Company to certify that the remainder of the pipeline was buried at the depth required by the 2013 Final Order.

On August 11, 2017, Vermont Gas filed data certifying the burial depth of the pipeline.

On November 21, 2017, I held a public hearing.

[8] Between April 3, 2015, and May 19, 2016, Vermont Gas filed, and the Commission approved, five requests to make non-substantial changes to the route of the pipeline and construction practices proposed for use along the route.

On January 3, 2018, I indefinitely suspended the schedule in Case No. 17-3550-INV until the Commission hired an independent third-party expert to verify Vermont Gas's burial-depth self-certification.

On February 16, 2018, the Department filed the NOPV in Case No. 18-0395-PET.

On April 4, 2018, the Commission issued an indefinite stay of Case No. 18-0395-PET.

On April 5, 2018, I notified the parties that the Commission had broadened the scope of the investigation in Case No. 17-3550-INV to include a thorough review of the construction, performance, and safety of the pipeline. The broadened scope of the investigation would include the allegations made by the Department in the NOPV in Case No. 18-0395-PET as well as the following allegations made by the Intervenors in Case No. 17-3550-INV: (1) uninspected repairs of damaged corrosion protection coatings; (2) failure to use clean sand as backfill as required; (3) failure to use backfill screened of rocks and 3-inch soil clods as required in the VELCO right-of-way; (4) failure to install zinc ribbon corrosion protection; (5) use of a "sink-in-the-swamp" method for installing the pipeline in wetlands; (6) failure to adopt and implement a quality assurance plan until the pipeline was nearly complete; and (7) failure to use bentonite trench breakers to protect wetlands at 13 wetland and stream crossings.

On January 7, 2019, the State of Vermont contracted with RCP Inc. of Houston, Texas, for William R. Byrd to serve as the independent investigator in this proceeding. Mr. Byrd was contracted to review Vermont Gas's self-certification of the pipeline burial depth, and the construction, performance, and safety of the Addison natural gas pipeline.

On January 10, 2019, I further broadened the scope of Mr. Byrd's review to include whether the Company used construction plans that were signed by a Vermont-licensed engineer. I also directed the Company to show cause why the Commission should not order that the pipeline cease operation.

On January 8, 2020, Mr. Byrd filed a final report of his investigation with attachments (the "Byrd Report").

The parties then engaged in discovery, including depositions of Vermont Gas personnel and Company-contracted personnel, and filed additional prefiled testimony and exhibits through August 2020.

From September 1-3, 2020, I held an evidentiary hearing. Along with hearing testimony from various witnesses and admitting evidence, I granted a motion from Vermont Gas taking

administrative notice that the evidence in Docket 7970 and the filings in Case No. 18-0395-PET were available to serve as evidence in this joint proceeding.

On October 2, 2020, the Intervenors and Vermont Gas each filed proposed findings of fact and conclusions of law and the Department filed a post-hearing brief.

On October 16, 2020, the parties filed reply briefs.

III. SUMMARY OF PUBLIC COMMENTS

On November 21, 2017, I conducted a joint public hearing for this case and Case No. 17-4630-INV at the Mount Abraham Union High School in Bristol, Vermont.[9] Twenty-four members of the public, including several of the Intervenors, made comments regarding safety concerns based on alleged noncompliance with construction standards, insufficient burial depth, and inadequate inspection. Some commenters also expressed a general frustration and distrust in Vermont Gas, the Department, and the Commission. Several commenters requested that the Commission hire an independent third-party investigator to inspect the pipeline.

The Commission has also received dozens of written public comments related to this investigation. The written comments expressed concern for pipeline safety, showed support for the Commission's opening of this broad investigation, questioned the independence of the third-party expert, and urged the Commission to shut down the pipeline and related cases until the pipeline was shown to be safe by an independent investigation.[10] In response to the many comments received, the Commission broadened the investigation to include several areas of concern and hired Mr. Byrd to conduct an independent investigation.

IV. LEGAL STANDARDS

This Order addresses the degree to which Vermont Gas is liable for having violated the 2013 Final Order and CPG and Commission Rule 5.408 in its construction of the Addison

[9] *Investigation pursuant to 30 V.S.A. §§ 30, 207, and 209 regarding the alleged failure of Vermont Gas Systems, Inc. to comply with the final order and certificate of public good in Docket 7970 by failing to observe the requirements of the Blasting Plan*. Case No. 17-4630-INV, Order of 7/31/20. In that case, the Commission investigated and issued a civil penalty of $57,500.00 for Vermont Gas's failure to observe the requirements of the Blasting Plan in the 2013 Final Order and CPG.

[10] The Commission has stayed any action in the *Petition of Vermont Gas Systems, Inc., pursuant to 30 V.S.A. § 248, for a certificate of public good to authorize construction of a pressure-regulation station in Monkton, Vermont*, Case No. 17-4909-PET, until the completion of this proceeding.

natural gas pipeline. This section of the Order addresses the operative language that created requirements in the 2013 Final Order and CPG. It also addresses the legal standards for a substantial change and a material deviation.

A. The 2013 Final Order and CPG

These documents establish the requirements and conditions imposed by the Commission when it approved the pipeline in Docket 7970 and set a baseline for determining any violations of the 2013 Final Order and CPG by Vermont Gas during construction of the pipeline. In these documents Vermont Gas is required to meet or exceed applicable state and federal standards and to comply with the plans and evidence that formed the basis for the Commission's findings as well as the MOUs approved and adopted in the 2013 Final Order. Various findings in the 2013 Final Order establish the construction standards that the Commission required Vermont Gas to achieve. These specific Docket 7970 findings will be further addressed in the Findings section, below. The Commission also addressed these standards broadly in its discussion of the findings in Docket 7970. For example, the Commission discussed the findings under the public health and safety criterion and stated that "Vermont Gas has designed and will construct and operate the Project in a manner which meets or exceeds all applicable state and federal codes and standards."[11]

Paragraph 2 of the Order section of the 2013 Final Order states:

> Construction of the proposed Project *shall be in accordance with plans and evidence* as submitted in this proceeding. Any material deviation from these plans or a substantial change to the Project must be approved by the [Commission]. Failure to obtain advance approval from the [Commission] for a *material deviation* from the approved plans or a *substantial change* to the Project may result in the assessment of a penalty pursuant to 30 V.S.A. §§ 30 and 247. (emphasis added)

This language is reiterated in paragraph 1 of the CPG, but in the CPG it includes the operations and maintenance of the Project along with its construction.

The Commission's approval of the Project was thus grounded in Vermont Gas's assurance that the Project would meet or exceed state and federal guidelines for safe pipeline

[11] 2013 Final Order at 92 (citations omitted).

construction.[12] Determining whether Vermont Gas is liable for violating the high standards required by the 2013 Final Order and CPG requires determining whether any unapproved deviations from those standards were material deviations from the approved plans or substantial changes to the Project.

Vermont Gas asserts that the unapproved changes made to the Project were minor and insubstantial and that the Commission expects "plans for a significant energy project to change after we issue it a CPG."[13] The Intervenors assert that the deviations from the plans and evidence submitted are both material and substantial and therefore require either approval of a CPG amendment or permit revocation. The Department contends that some of the changes made by Vermont Gas were substantial changes while others were material deviations and, absent advance approval by the Commission, violated the 2013 Final Order and CPG.

B. Substantial Change

The 2013 Final Order and CPG include language requiring prior approval from the Commission for a substantial change to the approved Project.

Commission Rule 5.408 addresses the requirement for Commission approval of substantial changes to an approved project and states:

> An amendment to a certificate of public good for construction of generation or transmission facilities, issued under 30 V.S.A. § 248, shall be required for a substantial change in the approved proposal. For the purpose of this subsection, a substantial change is a change in the approved proposal that has the potential for significant impact with respect to any of the criteria of Section 248(b) or on the general good of the state under Section 248(a). Commission Rule 5.408 requires a project developer to seek an amendment to a CPG when proposed changes to a previously approved project are substantial.

A substantial change is one that has "the potential for significant impact with respect to any of the criteria of Section 248(b) or on the general good of the state under Section 248(a)."[14]

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[12] 2013 Final Order at Finding 259 ("The Project has been designed and will be constructed and operated to meet or exceed all applicable state and federal codes and standards, including Part 192 of Title 49 of the Code of Federal Regulations (the safety standards of the Office of Pipeline Safety at the U.S. Department of Transportation), the 831.8 Code of the American Society of Mechanical Engineers (governing the design of gas transmission and distribution piping systems), and [PUC] Rule 6.100 pipeline safety). Teixeira pf. at 12-13.").

[13] Vermont Gas's Proposed Facts at 9 citing *Amended Petition of UPC Vt. Wind, LLC,* Docket 7156, Order of 3/24/09 at 7 & n.7 citing the Northwest Reliability Project ("NRP") in Docket No. 6860, where "the [Commission] reviewed and approved final design plans for various aspects of the NRP" but "did not require the petitioners to file an amended application for any of the final design plans."

[14] Commission Rule 5.408.

> Rule 5.408 expressly requires CPG amendments only for substantial changes, defined as those changes with the potential for significant impact under the applicable criteria of Section 248. As a result, myriad minor changes that can occur during the course of constructing a project do not place a developer in jeopardy of violating Rule 5.408. It is only when a developer undertakes substantial changes without first receiving authorization that such jeopardy arises.[15]

Even where an altered project would satisfy the standards of Section 248 "more easily than the original design," the Commission has indicated that it, rather than the petitioner, determines whether the standards are satisfied.[16] Nevertheless, the Commission has cautioned that it does not "wish to discourage petitioners from filing potential improvements to a proposed project for fear that additional procedural steps would significantly delay the proceeding."[17] The practice of reviewing requests for non-substantial change determinations is consistent with this precedent.

The question is whether proposed changes, considered within the context of the overall project, have the potential to result in a significant impact under the Section 248 criteria. If the answer is no, the Commission does not require petitioners to amend their CPG and instead approves requests for non-substantial change determinations.[18]

Vermont Gas observes that the Commission approved five requests for non-substantial change determinations for proposed deviations from the 2013 Final Order and CPG. These requests involved changes including the rerouting of the pipeline. These earlier changes did not require a CPG amendment because, based on the information provided about the proposed changes, the Commission found there was no potential for a significant impact under the relevant criteria. These five prior deviations from the plans and evidence approved in the 2013 Final Order were filed with the Commission and made available for review, comment, and public participation before the Commission approved them and Vermont Gas installed them.

Rule 5.408 requires a developer to obtain approval in advance for changes to a previously approved project when those changes have the potential for significant impacts under the

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[15] *Petition of Otter Creek Solar LLC requesting non-substantial change determinations or in the alternative amendments to the certificates of public good issued to the Otter Creek 1 and Otter Creek 2 Solar Projects in Rutland, Vermont in Case Nos. 8797 and 8798*, Case No. 19-3031-PET, Order of 3/19/20 at 33 (emphasis added).

[16] *Petition of Cross Pollination, Inc.,* Docket 7645, Order of 10/29/12 at 4; *See also Investigation into Citizens Utils. Co.,* Docket Nos. 5841/5859, Order of 6/16/97 at 131-33.

[17] *Amended Petition of UPC Vt. Wind, LLC,* Docket 7156, Order of 10/1/07 at 8 n.5 (emphasis added).

[18] *Id.*

applicable Section 248 criteria.[19] Review of such a request allows for a determination as to whether the potential for significant impacts from a proposed change is real, either material or substantial, or not. It also allows the opportunity for public participation in the Commission's oversight of that change request.

C. Material Deviation

The 2013 Final Order and CPG include language also requiring prior approval from the Commission for a material deviation from the approved plans for the Project.

The Commission has at times relied on Rule 5.408's "potential for significant impact" as guidance in assessing whether proposed changes constitute material deviations for CPG compliance purposes. However, the Commission has also determined that proposed changes can constitute material deviations from approved plans when they do not rise to the level of a substantial change under Rule 5.408. Such a situation arises when proposed changes that do not have the potential for significant impacts under any Section 248(b) criteria still result in a "broad alteration" to a previously approved project.[20] Because a material deviation may also include a broad alteration, the concepts of material deviation and substantial change are complementary but not "co-extensive."[21]

V. General Findings Describing the Project

The record in this case includes the findings and evidence in Docket 7970, the filings in Case No. 18-0395-PET, the filings of the parties as stipulated to in exhibit Joint-1, and the additional testimony and exhibits admitted during the evidentiary hearing that took place September 1-3, 2020.

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[19] *Id.* at 34 n. 60 (emphasis added).

[20] Case No. 19-3031-PET, Order of 3/19/20 at 7-9.

[21] *Id*. at 32-33 ("the Commission has not ruled that the two concepts are co-extensive."). *See also Petition of ERWR Whitcomb Farm Solar, LLC*, Docket 8076, Order of 9/18/14 at 4 ("Accordingly, we conclude that the proposed modifications constitute a material deviation under Condition 2. However, based on our conclusion that the proposed modifications will not have significant impacts under the applicable Section 248 criteria, we find that this material deviation is consistent with the criteria and we therefore approve ERWR's revised plans."); *see also Petition of New England Power Company, d/b/a National Grid*, Docket 8138, Order of 10/14/15 at 1 (finding proposed changes do not constitute a substantial change but approving them as a material deviation to previously approved plans).

As requested by the Intervenors in their draft findings, and absent objection by any party, I am also taking administrative notice of the National Transportation Safety Board's safety recommendation report based on its review of the Merrimack Valley, Massachusetts, explosions and fires of September 13, 2018, entitled *Natural Gas Distribution System Development and Review (Urgent)*, issued on November 14, 2018 (the "NTSB Report").

I am also admitting, subject to the objection of the parties,[22] what was marked as Intervenors' Cross Exhibit 13. This document is a report by the Vermont Office of Professional Responsibility responding to a complaint that the engineers assisting in the preparation of Vermont Gas's petition in Docket 7970 were not properly licensed. The "2014 OPR Report" was issued on January 30, 2014.

Findings

1. Vermont Gas is a "company" as defined by 30 V.S.A. § 201, and as such is subject to the Commission's jurisdiction pursuant to 30 V.S.A. § 203. 2013 Final Order Finding 1.

2. On November 7, 1963, the Commission issued Vermont Gas a CPG to organize and operate as a natural gas utility authorized to provide natural gas service to customers in the State of Vermont. 2013 Final Order Finding 2.

3. The original Project design, submitted on December 20, 2012, was subsequently revised in submissions filed by VGS on February 28, 2013, and again on June 28, 2013, to include re-routes and shifts in the corridor alignment, as well as construction design changes to reduce landowner, environmental or cultural resource impacts. 2013 Final Order Finding 11.

4. Under the Pipeline Safety Code, 49 C.F.R. Part 192, natural gas pipelines are given a classification from 1 through 4 to reflect the population density of the area in which the pipeline is located. A Class 1 designation applies to the lowest population density areas, and Class 4 applies to the most populated areas. The Code requires that pipe in higher-Class locations be stronger and monitored more frequently. 2013 Final Order Finding 24.

5. The majority of the pipeline route, approximately 37 miles, is designated as Class 1 or Class 2. Less than 6 miles is designated as Class 3. There are no areas along the Project that qualify as Class 4 locations. 2013 Final Order Finding 25; 49 C.F.R. 192.327.

[22] Any objection to the admission of this document into evidence shall be filed within 14 days of the issuance of this Order.

6. The Department recommended, and Vermont Gas agreed, to build the pipeline to meet Class 3 standards, even in those areas where only Class 1 or Class 2 standards would normally apply. A Class 3 pipeline has a 3-foot required minimum burial depth. 2013 Final Order Finding 26.

7. As required under the Pipeline Safety Code, the pipeline has an external corrosion-control coating. The coating varies depending upon soil conditions but generally consists of 15 mils thickness of fusion-bond epoxy or Pritec. Pritec is a two-layer anti-corrosion coating designed to protect pipes used in oil, gas, water, and wastewater pipelines. This coating combines the proven protective qualities of a polyethylene outer coating with a special butyl rubber adhesive. 2013 Final Order Finding 28.

8. As described in the 2013 Final Order, the process of the pipeline construction would involve a series of steps that generally proceed in the following sequence:

a. The construction is expected to be sequenced from north to south with multiple construction sections.
b. The route is first cleared, and temporary work areas are prepared.
c. Perimeter erosion control measures, such as silt fences, are installed along sensitive resource areas such as stream edges and wetlands to control sediment.
d. In the elements of the Project that do not involve horizontal directional drilling, a trenching process will be used. A four to five-foot wide trench will be excavated to a depth of approximately five feet, and soil from the trench will be stockpiled adjacent to the trench within the construction corridor. There will be different construction configurations for each of the different types of areas to be crossed, including wetlands, agricultural areas, and within the public highway right-of-way.
e. Pipe lengths will be welded together, inspected, and laid in the trench. Warning tape will be laid over the line, and then the trench will be backfilled. The pipe will be covered by at least 36 inches of soil. The pipeline will have four feet of cover in agricultural areas and within the VELCO ROW, generally five feet of cover at road crossings, and seven feet of cover at open-cut streams.

f. The landscape will be restored as closely as possible to pre-construction conditions in accordance with applicable permit requirements.

2013 Final Order Finding 62.

9. The 2013 Final Order required that the Project be designed, constructed, and operated to meet or exceed all applicable state and federal codes and standards, including Part 192 of Title 49 of the Code of Federal Regulations (the safety standards of the Office of Pipeline Safety at the U.S. Department of Transportation), the 831.8 Code of the American Society of Mechanical Engineers (governing the design of gas transmission and distribution piping systems), and Commission Rule 6.100 (pipeline safety). 2013 Final Order Finding 259.

10. The Commission was provided a graphic representation of the general construction method to be used in constructing the pipeline and a briefing of the various steps to be followed to install the pipeline. Docket 7970 Exh. Pet. JH-13 (see Figure 1, below); Docket 7970 John Heintz, Vermont Gas (Heintz) pf. 12/20/12 at 25-26, 33.

11. The pipeline selected for installation was 12.75 inches in diameter with a wall thickness of 0.312 inches for the entire route. The pipe was coated with 1.5 inches of concrete. The total pipeline diameter is 15.75 inches. 2013 Final Order Finding 502; Bubolz Deposition at 57.

12. As part of the assessment and review of the 2013 Final Order, Vermont Gas agreed to adopt additional safety measures recommended by the Department. As a result, the Project should have exceeded the safety standards established by the Pipeline Safety Code in several important respects, including the following:

- The pipeline would be constructed to meet Class 3 design requirements in all areas along the pipeline;
- VGS would use a non-shielding cathodic protection coating on the pipeline and a special coating on pipe used for trenchless installation to resist abrasions and other damage that could possibly occur during installation.

2013 Final Order Finding 262.

13. Figure 1, below, displays the stages of pipeline construction in sequential order. First, the route is cleared. Next, "ditching" occurs. After the ditching, "padding ditch bottom" occurs. A backhoe and bulldozer are used to unload material into the ditch during "padding ditch bottom." After the padding has been laid down, sections of the pipe are laid alongside the trench, and these sections are bent and then welded together. The welding is then x-rayed, and

the welds are coated. The coating is then inspected. Then "lowering in" occurs. Finally, backfill is used to cover the pipeline. Exh. JH-13.

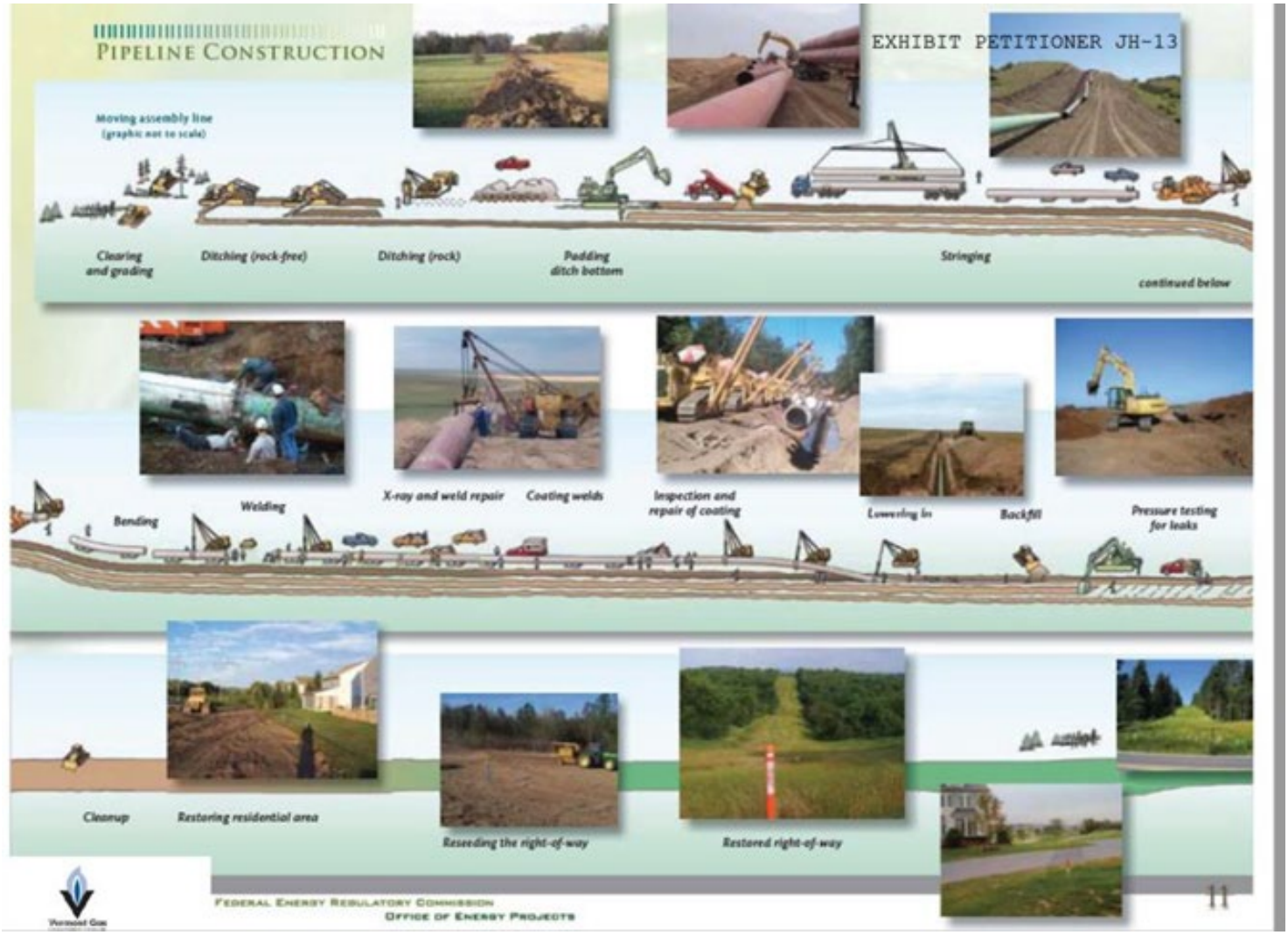


Figure 1. Pipeline Construction Diagram

14. The Commission concluded that the Project would not have an adverse effect on public health and safety because:

(a) Vermont Gas was to design, construct, and operate the Project in a manner which met or exceeded all applicable state and federal codes and standards;
(b) the expert consultant retained by the Department thoroughly reviewed the Project as proposed by Vermont Gas and heightened and expanded the design, construction, operation, maintenance, and testing standards which would apply; and

(c) Vermont Gas demonstrated a commitment to these high design, construction, operation, and maintenance standards to ensure there would be no undue adverse impact from the Project on safety or public health.

2013 Final Order at 92.

VI. FINDINGS OF SUBSTANTIAL CHANGES

A. Failure to Bury the Pipeline in the Clay Plains Swamp Using Approved Burial Methods

15. The Clay Plains Swamp is just north of the Monkton-New Haven town line. The Clay Plains Swamp is approximately 2,500 feet long. Exh. VGS-JSH-6.

16. The Clay Plains Swamp, also referred to as the Red/Silver Maple-Green Ash Swamp, is part of a significant natural community along the Project route. It is considered a rare and irreplaceable natural area. Pipeline construction may have an adverse effect on a rare and irreplaceable natural area. 2013 Final Order Findings 474 and 475; Eric Sorenson, Vermont Agency of Natural Resources ("Sorenson") Docket 7970 pf. 6/11/13 at 21.

17. ANR proposed an alternate site for routing the pipeline that would avoid the rare and irreplaceable natural area in the Clay Plains Swamp. This option was not accepted by Vermont Gas. Sorenson Docket 7970 pf. 6/11/13 at 23.

18. Karl Bubolz was the superintendent for Michels Corporation, which was the main pipeline contractor. On September 12, 2016, Mr. Bubolz met with Mike Reagan, from Hatch Mott McDonald, which was the contracted construction manager for Vermont Gas, and Darrell Crandall, who was contracted to serve as the chief pipeline construction inspector. They met to discuss the impending challenges of installing the pipeline in the Clay Plains Swamp caused by the lack of solid ground and the narrow right-of-way. The pipeline right-of-way was generally 50 feet wide. It was only 30 feet wide in the Clay Plains Swamp. No Vermont Gas staff employees attended this field meeting. Tr. 9/3/20 at 48 (St. Hilaire); Bubolz Deposition at 42-44.

19. At the meeting on September 12, Mr. Bubolz urged the use of either metal sheeting or additional land outside the 30-foot-wide construction easement in the Clay Plains Swamp. He stated that without the use of either metal sheeting or land outside the 30-foot-wide easement area, it would not be possible to store removed soils or to achieve the required four-foot depth of

cover in the Clay Plains Swamp. This length of the pipeline was required to have at least a four-foot burial depth because it was in the VELCO right-of-way. Mr. Bubolz also proposed using horizontal directional drilling ("HDD"), which had not been selected for use by Vermont Gas in this section of pipeline because HDD was more costly. Bubolz Deposition p. 43, 88-89.

20. Several planning and design considerations were to be applied to mitigate undue adverse effects from the Project on Class II wetlands and wetland buffers. These mitigation measures included: (1) modifying the pipeline alignment where possible to avoid significant wetlands or minimize impacts; (2) using HDD at specific locations to avoid or minimize impacts; (3) the narrowing of temporary construction workspaces where possible within wetlands/buffers to minimize forested wetland clearing; and (4) using timber mats during construction to minimize wetland disturbance. 2013 Final Order Finding 400.

21. The September 12 meeting participants (Bubolz, Reagan, and Crandall) concluded that "the answer was to get it done and make good later." The participants did not request the construction management team to allow the use of sheeting in the Clay Plains Swamp. The wet conditions and the narrow right-of-way made this method impractical because it would require the use of heavy equipment in a very limited area of unstable soils. Given these constraints, the meeting participants agreed among themselves to use the sink-in-the-swamp method for burying the pipeline. Bubolz Deposition at 45, 47, and 121; tr. 9/3/20 at 20, 49 (St. Hilaire).

22. Mr. Bubolz had never used the sink-in-the-swamp method before and it was neither in the Project specifications nor addressed in the 2013 Final Order, but he was familiar with it. This method involved laying the pipe along the right-of-way in a trench and further excavating adjacent to the pipe so that the pipe would slide into the deeper area, sink, and be effectively buried. Bubolz Deposition at 62-64, 92-93, 105-108, and 133-134.

23. Initial construction of the pipeline in the Clay Plains Swamp occurred on Thursday and Friday, September 15 and 16, 2016, and was completed the following work week on Monday and Tuesday, September 19 and 20, 2016. Exh. VGS-JSH-2 at 8.

24. On September 15, 2016, the soils being excavated were so saturated and difficult to work with that a piece of heavy equipment slid off the wooden mats that had been laid across the adjacent wetland. The heavy equipment became stuck in the wetlands mud. Bubolz Deposition pp. 62-63.

25. The 2013 Final Order required that the Project use either the open-trenching method shown in Figure 1, above, or HDD to install the pipeline. Docket 7970 Heintz pf. 12/20/12 at 25-26, 33.[23]

26. The trench should have been excavated to a width of four to five feet and to a depth of approximately five feet. Docket 7970 Heintz pf. 12/20/12 at 25-26; Docket 7970 Heintz pf. 2/28/13 at 31-32.

27. Soil removed from the trench was to be stockpiled adjacent to the trench. Docket 7970 Heintz pf. 12/20/12 at 25-26; Docket 7970 Heintz pf. 2/28/13 at 31-32.

28. Docket 7970 Exhibit JH-3 included 33 different construction configurations. Twenty-nine of the construction configurations showed the open-cut trench method; four showed HDD. Each of the 29 open-cut trench-method configurations included a snapshot of the trench profile. Each shows excavation of a single trench, and removal of soil and stockpiling it outside the trench. Docket 7970 Exh. Pet. JH-3.

29. In wetlands and agricultural areas, where trenches would be used, soil horizons were to be removed in order and stockpiled so that horizons could be restored as closely as possible to pre-construction conditions. A soil horizon is a layer parallel to the soil surface, whose physical characteristics differ from the layers above and beneath. Each soil type usually has three or four horizons. Horizons are defined in most cases by obvious physical features, chiefly color and texture. Water dissolves and removes nutrients as it passes through the soil horizon. 2013 Final Order Finding 68.

30. In the Clay Plains Swamp, soils were not removed from the trench in layers, stockpiled in layers, or returned in layers that corresponded with the surrounding soils. There was not enough room to stack the removed soils, so this was not done. Some of the excess soil was deposited offsite because there was nowhere in the narrow right-of-way to place it. Bubolz Deposition at 88.

31. In the swamp, Michels Corporation's equipment operators relied on visual inspection of burial depth and trench bottom from the seat of their equipment; they did not enter the trench to inspect what the pipeline was resting upon. Bubolz at 27-31.

[23] For an illustration of a cross section of a typical open-cut trench pipeline installation see Figure 2, below, at page 45.

32. The removal of soil from the second trench, into which the pipeline would slide, was done to a depth that appeared visually to be deep enough. Bubolz Deposition at 111-112.

Discussion

Vermont Gas testified in Docket 7970 that it would use either open-cut trench installation or HDD to install the pipeline in wetland areas. Vermont Gas never testified that it would use any other method, including specifically the sink-in-the-swamp method. By using the sink-in-the-swamp method to bury the pipeline in the Clay Plains Swamp, Vermont Gas failed to construct the pipeline consistent with its testimony and as approved by the Commission.

After reviewing Vermont Gas's request for a non-substantial change determination, ANR concluded that:

> [T]he pipeline burial method [in the swamp] does not change the disturbance footprint and does not raise any significant concerns with regard to impacts to the natural environment. In addition, the described work does not require any [ANR] permits.[24]

ANR filed no additional comments on Vermont Gas's failure to properly bury the pipeline in the Clay Plains Swamp after Mr. Byrd completed his investigation and the evidentiary hearing occurred.

The Intervenors assert that not only did using the sink-in-the-swamp method of installing the pipeline in the Clay Plains Swamp violate the 2013 Final Order and CPG, but also that:

> [Vermont Gas]'s delay, from September 20, 2016 to June 2, 2017, was a violation of its duty to promptly inform the Commission of the deviation from the filed evidence and plans and to obtain either a non-substantial change ruling or an amended CPG before continuing construction and then placing the pipeline into service.[25]

I find that Vermont Gas's use of an unapproved method of pipeline installation in the Clay Plains Swamp, a rare and irreplaceable natural area, was a substantial change that had the potential for significant impact, at a minimum, under the natural resources criteria of Section

[24] Letter from Donald J. Einhorn, Esq., ANR, to Judith C. Whitney, Clerk of the Commission, dated June 19, 2017.

[25] Intervenors Reply Brief at 5.

248.[26] Vermont Gas's failure to obtain Commission approval before using this method to install the pipeline in the swamp was therefore a violation of the 2013 Final Order, the CPG, and Commission Rule 5.400. Mr. Bubolz's apparent belief that VELCO approved of the use of the sink-in-the-swamp method of installation does not excuse Vermont Gas's failure to obtain Commission approval for the change.

B. Failure to Achieve the Approved Burial Depth in the Clay Plains Swamp

33. The VELCO MOU set a four-foot depth-of-cover standard for the pipeline in the VELCO right-of-way. VELCO MOU at ¶ 5.

34. On September 15, 2016, Mr. Bubolz contacted Mr. Crandall and Mr. Reagan and informed them that because of the swampy conditions his crew would be unable to achieve the required four-foot burial depth. Bubolz Deposition at 82-85.

35. Mr. Bubolz was informed sometime before September 21, 2016, that VELCO had "approved" the work done in the Clay Plains Swamp. Bubolz Deposition at 85.

36. No surveying of burial depth was done during pipeline construction in the Clay Plains Swamp. Bubolz Deposition at 81.

37. The daily construction inspection report to Vermont Gas for September 19, 2016, states that the burial depth for the pipeline in some areas of the Clay Plains Swamp route was 3.0 feet, 3.2 feet, 3.6 feet, and 3.9 feet deep. Exh. Int. Cross 33A.

38. On Monday, September 19, 2016, Mr. Reagan notified John St. Hilaire, Vermont Gas's project engineer, that the pipeline was installed in the Clay Plains Swamp but that Michels was not able to achieve four feet of cover. The depth-of-cover was then estimated to be less than four feet over 300 feet of pipeline. Tr. 9/3/20 at 29 (St. Hilaire); Intervenors Cross exhibit 33A.

39. Also on September 19, 2016, Lawrence Shelton took photographs and a video of the construction process in the Clay Plains Swamp. The photographs and video showed the pipeline in a trench and awaiting cover. Mr. Shelton estimated that the top of the pipeline was less than two feet from the surface of the surrounding land. Lawrence Shelton, Intervenors ("Shelton") pf. at 2; Shelton exhs. 2 and 3.

[26] Vermont Gas's use of the sink-in-the-swamp method of installation not only had the potential for significant impact under the natural resources criteria of Section 248, but as discussed in the next section, it also resulted in Vermont Gas's failure to meet the required minimum burial depth for the pipeline.

40. Michels communicated to Vermont Gas that, because of the swampy conditions, it lacked confidence that a second attempt at burying the pipe would be any more successful at getting the pipe to a depth of four feet throughout the Clay Plains Swamp. Exh. VGS-JSH-2 at 11.

41. Mr. St. Hilaire sought VELCO's opinion as to the impact of the deviation from the four-foot burial depth (agreed upon in the VELCO MOU) on the safety of the VELCO right-of-way and the expectations of VELCO. Tr. 9/3/20 at 30 (St. Hilaire).

42. The principal issue of concern for VELCO in these discussions was whether the pipeline would achieve the necessary loading standard to safely allow VELCO to undertake future transmission-line construction in its right-of-way. Exh. VGS-JSH-2 at 11.

43. The loading standard was addressed in the VELCO MOU and states that Vermont Gas was to design the Project in VELCO's right-of-way and access roads to meet a standard achieved for highways of HS-20+15%. The HS-20+15% standard is the term used by American Association of State Highway and Transportation Officials and the American Concrete Institute to describe normal moving traffic loading conditions up to 18-wheeler loading. It is also the standard for pipeline burial depth beneath a highway recommended by the American Petroleum Institute. The HS-20+15% standard would allow a vehicle with a 36,800-pound axle load to be safely driven over the pipeline. In the VELCO MOU, Vermont Gas agreed it would achieve the HS-20+15% standard by using Class 3 pipe buried at a depth of four feet. Effectively, Vermont Gas agreed to use a highway loading standard in the Clay Plains Swamp. VELCO MOU at ¶ 5; Byrd Report at 43 and 70.

44. On September 20, 2016, VELCO reviewed a technical report provided by Vermont Gas's construction engineer assessing the new load impact created by not meeting the four-foot burial depth in the Clay Plains Swamp. That report relied on a data assessment tool from an American Petroleum Institute recommended practice. That report used a data assessment tool applicable to an HDD installation that assumes a bore width of 12.75 inches. VELCO should have reviewed a data assessment tool for an open-cut trench with a pipeline diameter of 15.75

inches (with the protective concrete wrap).[27] Tr. 9/2/10 at 27 (Byrd); St. Hilaire Exh. 2 at 124-126.

45. On September 21, 2016, VELCO responded to Vermont Gas's notice that it did not meet the four-foot burial depth requirement. Despite the deviation from the MOU requirement, VELCO did not disagree with Vermont Gas moving forward with construction at less than four feet of cover in the Clay Plains Swamp as long as the engineering analysis could confirm that the necessary loading factor would be met. Exh. VGS-JSH-2 at 124.

46. Due to the wet, muddy soil, the survey crew was unable to reenter the Clay Plains Swamp until November 4 and 6 to take final grade depth-of-cover measurements. Exh. VGS-JSH-2 at 10; tr. 9/3/20 at 27 (St. Hilaire).

47. On November 9, 2016, the survey crew reported that 18 welds were not installed to depth in the Clay Plains Swamp. Exh. VGS-JSH-2 at 10; tr. 9/3/20 at 27 (St. Hilaire).

48. At that time, Mr. St. Hilaire again notified VELCO that Vermont Gas had not achieved the four-foot burial depth needed to achieve the HS-20+15% load standard. Tr. 9/3/20 at 27 (St. Hilaire).

49. By December 12, 2016, Michels Corporation had remediated the depth-of-cover issues along the pipeline except for the 18 locations in the Clay Plains Swamp. The remediation work typically involved adding more cover and further contouring the soil surface. Exh. VGS-JSH-2 at 11-12; tr. 9/3/20 at 27 (St. Hilaire).

50. Michels Corporation informed Vermont Gas during this remediation work that the Clay Plains Swamp locations could not be successfully remediated through adding cover and further contouring due to continuous swampy conditions. Exh. VGS-JSH-2 at 121.

51. On January 3, 2017, Mr. St. Hilaire briefed the Department's gas engineer regarding the 18 locations where the required burial depth was not achieved in the Clay Plains Swamp, the use of the sink-in-the-swamp method, and Vermont Gas's decision to leave the pipeline as is if VELCO agreed. Exh. VGS-JSH-2 at 12.

52. From January through April 25, 2017, Vermont Gas worked with VELCO to determine whether VELCO, consistent with its initial September 2016 review of the issue, would

[27] Vermont Gas also relied on this mistaken technical report in making its June 2, 2017, filing seeking a non-substantial change determination from the Commission. Vermont Gas Sixth Request for a Non-Substantial Change Determination, June 2, 2017, at Attachment 1.

agree to leave the pipe as installed if it met the loading standard. Based on the incorrect HDD engineering study, on April 25, 2017, VELCO provided a letter of approval for Vermont Gas to leave the pipe in place. Exh. VGS-JSH-2 at 12.

53. Additional conditions were required by VELCO and agreed to by Vermont Gas that consisted principally of additional warning signs in the right-of-way. St. Hilaire pf. at 11.

54. On March 3, 2017, Mr. Shelton revisited the site in the Clay Plains Swamp where he took the photographs and the video. He was accompanied by G.C. Morris, the Department's gas engineer. They observed a marker directly over the pipeline that indicated that it was buried at 3.5 feet. Shelton pf. at 4.

55. On August 27, 2019, Mr. Shelton visited the site again with Mr. Byrd during Mr. Byrd's investigation. The purpose of the visit was to assess the burial depths at the site. Mr. Shelton testified that:

> One of [Vermont Gas] technicians was able to locate the pipeline with a fiberglass probe. The only problem: no one had a measuring tape to measure the depth of the probe. I had an 8.5" x 11"-line notepad I had brought to take notes. Mr. Byrd borrowed a sheet of my paper and suggested that this page was 8.5" wide and that we would measure the burial depth of the pipeline by probing around until we hit what we thought was the pipeline, hold a thumb at ground level, extract the probe, and 'measure' it with the piece of notepaper. In several locations I personally observed that, when my notepad was used as the ruler, the probe measured no more than, and probably less than, 3 page-widths deep (3 x 8.5" = 25.5"). In other words, the pipeline was, at most an inch and a half more than 2 feet deep. Mr. Byrd, after measuring the depth to be three-page widths, declared "We'll call that 30 inches."

Shelton pf. at 4-5.

56. As part of his investigation report, Mr. Byrd filed Attachment 9, which is his documentation of the burial depths he observed on August 27, 2019, in the Clay Plains Swamp. Attachment 9 reports measurements less than four feet for a distance of at least 505 feet, within which there is a 260-foot length of pipeline that is less than three feet, including measurements of 2'9", 2'9", 2'6", 2'6", 2'5"; and 2'11". Near the end of the pipeline route there is a second length of pipeline at less than four feet (3'9"). Shelton pf. at 7; Byrd Report Attachment 9.

Discussion

The 2013 Final Order summarized the VELCO MOU as follows:

> On June 12, 2013, Vermont Gas and VELCO entered into an MOU (exh. VELCO PWL-2) which addresses the terms and conditions under which VELCO will allow Vermont Gas to co-locate various lengths of the Project within the existing VELCO bulk transmission line right-of-way granted to VELCO in easements in Chittenden and Addison counties. The VELCO MOU does not establish whether the co-location will be documented with a lease, license, or an easement, nor does the MOU address any specific terms of payment. The VGS-VELCO MOU does, however, commit the parties to certain safety and emergency standards and binds both parties to negotiate in good faith in an iterative process as the final form of Project plan is resolved. Vermont Gas and VELCO have targeted December 31, 2013, as the date for finalizing an operating agreement addressing procedures to be used by the parties in implementing the terms of their MOU.[28]

Vermont Gas argues that the VELCO MOU permitted it to negotiate the deviation from the burial depth in the Clay Plains Swamp. I disagree. The Commission's adoption of the VELCO MOU in September 2013 recognized that VELCO and Vermont Gas had not finalized all the details of Project design, the real property documents reflecting Vermont Gas's use of the VELCO right-of-way, and the amount of payment for Vermont Gas's use of that right-of-way for the pipeline.[29] The Commission has the authority to oversee any changes or limitations to the VELCO MOU.[30] It was the Commission's expectation that these final details would be hammered out between the two utilities shortly after the MOU was adopted. In addition, the Commission's approval of the MOU does not excuse Vermont Gas from paragraph 2 of the 2013 Final Order, Condition 1 of the CPG, or Commission Rule 5.408. In other words, if discussions between VELCO and Vermont Gas resulted in an agreement for a substantial change or material deviation from what was approved, Vermont Gas was still required to seek and receive Commission approval before implementing any such change.

Furthermore, the VELCO MOU specifically set a four-foot depth-of-cover standard for the pipeline in the VELCO right-of-way. This was not a term left for negotiation. The Commission's adoption of the VELCO MOU thus required that Vermont Gas achieve the four-foot-depth standard in the VELCO right-of-way. The Commission did not delegate to VELCO the option of deviating from that standard in September 2016 as argued by Vermont Gas.

[28] 2013 Final Order at 11.
[29] VELCO MOU at ¶ 4.
[30] *Id*. at ¶ 21.

After Vermont Gas used the sink-in-the-swamp method, Vermont Gas gave VELCO, its electrical affiliate, the opportunity to comment on that change, but it did not notify either the Department or the Commission of its intent to deviate from the required burial depth. VELCO gave Vermont Gas its after-the-fact "approval" by accepting further limitations on its future use of the right-of-way. VELCO's "approval" of the reduced burial depth was conditioned on the shallower depth still meeting the agreed-upon loading standard. Unfortunately, VELCO relied on an engineering study that concluded that the loading standard would be achieved using HDD, not the sink-in-the-swamp burial method. By relying on this incorrect study, VELCO inadvertently accepted limits on the future use of its right-of-way.

In his independent investigation, Mr. Byrd concluded that the use of the sink-in-swamp method was not a substantial change. He found that while its use is extremely rare, the method is another acceptable open-cut trench burial method that has been used elsewhere. He found that this deviation was "adequately analyzed" and "safe."[31] This was because the pipeline in the swamp was located at the edge of the VELCO right-of-way and the HS-20+15% loading standard was "very conservative."[32] "You couldn't just drive a vehicle down there in normal circumstances."[33] Nonetheless, giving a nod to the appropriate process for making the deviation and the investigation that followed Vermont Gas's failure to observe that process, Mr. Byrd concluded that "[i]n hindsight, HDD might have been preferable for this location as well."[34]

In its review of Vermont Gas's non-substantial change determination request, the Department concluded that using the sink-in-the-swamp method, while safe, is a material deviation from the approved plans based on its gas pipeline consultant (David Berger) that "the loading on the pipeline by heavy equipment does not impair the integrity of the pipeline."[35]

In its brief after the evidentiary hearing, the Department concluded that Vermont Gas violated its CPG by failing to receive Commission approval for a material deviation to the VELCO right-of-way depth requirement.

> The Department disagrees with the argument made by [Vermont Gas] that such a deviation from the VELCO MOU submitted in the authorizing docket does not constitute a "material deviation." The Commission, the Department, and interested

[31] Byrd Report at 69 and 72.
[32] *Id*. at 41
[33] Tr. 9/2/20 at 18 (Byrd).
[34] *Id*. at 69.
[35] Letter of Timothy M. Duggan, Department, to Judith Whitney, Clerk of the Commission, dated 6/23/17, at 2.

> parties relied upon the representations by VGS to abide by the terms of the MOU between itself and VELCO. Individual alteration of the binding terms contained within an MOU without prior approval by the Commission constitutes a material change to the plans and evidence submitted in the proceeding. The Department maintains that the terms contained within an MOU and relied upon by the Commission in its findings and issuance of a Certificate of Public Good are material and [Vermont Gas's] deviation from those terms necessitates Commission approval.[36]

The Department does not agree that the deviation from the 2013 Final Order is a substantial change with the potential for significant impact on "system stability and reliability or public health and safety." The Department focused on the safety of the pipeline and did not address VELCO's future electric transmission requirements. "Despite the minimal risk to the pipeline's integrity, [Vermont Gas] agreed to the remedial actions recommended by the Department and VELCO to ensure the continued safety of the pipeline's construction and operation."[37]

In their after-the-fact reviews, VELCO, Mr. Byrd, and Mr. Berger all acknowledge that Vermont Gas's failure to properly bury the pipeline in the Clay Plains Swamp may affect the safety of the pipeline and create limits on the use of the VELCO right-of-way. In this way, they all support the Intervenors' conclusion that the failure to achieve the four-foot burial depth had a potential impact on public health and safety and hence is a substantial change made in violation of the 2013 Final Order, CPG, and Rule 5.408.

The 2013 Final Order and CPG directed Vermont Gas to bury the pipeline with a four-foot depth-of-cover in the VELCO right-of-way. Vermont Gas submitted plans and evidence to the Commission that the four-foot depth-of-cover would be achieved for the pipeline by using either the open-cut trench method or HDD. Neither of those installation methods was used and the four-foot depth-of-cover requirement − the VELCO right-of-way standard−was not achieved in the Clay Plains Swamp. In fact, the depth is less than three feet − the Class 3 standard to which Vermont Gas agreed for the entire pipeline − over a 260-foot length of the pipeline in the Clay Plains Swamp.

The requirement for a four-foot depth-of-cover arose from the VELCO MOU. VELCO and the Commission, which adopted the VELCO MOU standard, wanted to ensure that the

[36] DPS Reply Brief at 2.
[37] *Id.*

pipeline would not create a safety concern should future transmission-line construction be undertaken in VELCO's right-of-way. The four-foot burial depth was selected to meet the HS-20+15% depth-of-cover standard that would make the pipeline safe from the impact of heavy equipment in the event VELCO constructed a second transmission line immediately nearby in the VELCO right-of-way. Applying the highway load standard would allow VELCO to exercise the full use of its right-of-way if it constructed a second transmission line. Therefore, the Commission relied on the four-foot-depth standard in making its determination that the Project would not have undue adverse impacts under relevant Section 248 criteria.

The failure to meet the required load standard has a potential impact principally on public safety under § 248(b)(5). Because the failure to meet the loading standard may limit the ability of VELCO to build a second transmission line in its right-of-way, the deviation also has a potential impact on meeting future electrical transmission needs under § 248(b)(2) and the future stability and reliability of the electric transmission system under § 248(b)(3). As a result, Vermont Gas's failure to bury the pipeline in the Clay Plains Swamp at the burial depth that would meet the loading standard also has a potential impact on the economy of the State under § 248(b)(4). None of these potential Section 248 impacts has been addressed by Vermont Gas. The reason for the VELCO "approval," while relevant, is not dispositive as to whether the substantial change has the potential for impact under the Section 248 criteria, nor does it excuse Vermont Gas from its responsibilities under the 2013 Final Order, CPG, or Rule 5.408.

I conclude that Vermont Gas's failure to bury the pipeline at the required depth in the Clay Plains Swamp without first receiving Commission approval resulted in violations of the 2013 Final Order, the CPG, and Rule 5.408. This deviation from the plans and evidence submitted in Docket 7970 was a substantial change with the potential for significant impacts under several Section 248 criteria.

C. Failure to Conform with Trench Bottom and Trench Breaker Specifications

57. The 2013 Final Order and CPG required Vermont Gas to meet or exceed the Federal Minimum Pipeline Safety Standards found in 49 C.F.R. Part 192. 2013 Final Order Finding 259.

58. These minimum standards required Vermont Gas to: (1) construct the pipeline in accordance with comprehensive written specifications; and (2) backfill the trench in a manner

that provides firm support under the pipe and prevents damage to the pipe and pipe coating from equipment or from the backfill. 49 C.F.R. Part 192, Sections 192.303 and 192.219.

59. Vermont Gas issued technical specifications to its contractors. Byrd Report, Att. 17.

60. Section 312333 of these specifications sets the standard for "the excavation of trenching, backfilling, compacting, dewatering, excavation support and disposal." These specifications were occasionally updated. Byrd Report, Att. 17.

61. On April 29, 2015, section 312333 was updated to state:

> Pipe supports shall be installed in all locations prior to backfilling, unless otherwise directed by the Construction Management Team - refer project design drawings for further requirements. Stacked sandbags, pipe pillows, or owner approved equal are acceptable methods. Spacing shall be per manufacturers recommendations, if a commercial product, or 15' maximum intervals if sandbags.

Department NOPV in Case No. 18-0395-PET, 2/16/18 at 2.

62. On August 31, 2015, the Department observed Vermont Gas lay nearly 4,000 feet of pipeline directly on the trench bottom without trench supports. Department NOPV in Case No. 18-0395-PET, 2/16/18 at 2.

63. Vermont Gas laid the pipe directly on the trench bottom until September 18, 2016, as long as the soil was free of rocks. The pipeline was laid on native soils. Byrd Report at 36, 39, 65; Department NOPV in Case No. 18-0395-PET, 2/16/18 at 3.

64. The Department issued a notice of proposed violation in Case No. 18-0395-PET because it found that installing the pipe directly on the bottom of the trench was not in accordance with Vermont Gas's written specifications and was therefore a violation of 49 C.F.R. §192.303. Department NOPV in Case No. 18-0395-PET, 2/16/18 at 3.

65. The design called for the installation of trench breakers at specified intervals along the pipeline, based on surface topography. The trench breakers were to be filled with bentonite and would reduce the trench's overall transmissibility of water while still allowing some water to pass. Trench breakers maintain the status quo for ground-water flow, preventing the pipeline from becoming a conduit for the movement of water. 2013 Final Order Finding 429.

66. In addition, the design calls for bentonite trench breakers at the limits of each wetland. The bentonite trench breakers would act as a plug in the trench to inhibit the migration

of water from wetland areas. The installation of these mitigation devices would minimize impacts associated with the installation of the pipeline trench. 2013 Final Order Finding 430.

67. In its notice of probable violation in Case No. 18-0395-PET, the Department also found that Vermont Gas deviated from the specifications in its installation of trench breakers. Trench breakers are used to "break" the flow of groundwater along the buried pipe to reduce soil erosion around the pipe. Vermont Gas investigated this discrepancy and found that there were some locations where the trench breakers had been designed on paper but where field conditions did not require their installation and other places where a trench breaker had not been designed but was needed and installed. None of these changes to the written design was documented. Absent documentation, the Department was concerned that these changes may create a greater risk of soil erosion and affect the integrity of the pipe. Department NOPV in Case No. 18-0395-PET, 2/16/18 at 3-4.

68. The Department recommended remedial action. This included not laying the pipe on the trench bottom, properly documenting any deviations from the written specifications where trench breakers were installed, and later inspection of the pipeline after installation to protect against any effect these deviations may have on the pipeline's integrity. Department NOPV in Case No. 18-0395-PET, 2/16/18 at 5.

69. Vermont Gas and the Department stipulated to the remedial actions and Vermont Gas agreed to pay a civil penalty of $25,000. Vermont Gas Stipulation in Case No. 18-0395-PET, 3/27/18.

70. The use of trench breakers also limits the flow of water along the pipeline that might reach other waterways. ANR has concluded based on site inspections that the deviations in the placement of trench breakers has not had an adverse impact on the environment. Byrd Report, Att. 70.

Discussion

The Department and Vermont Gas have stipulated to the trench bottom and trench breaker violations alleged in the notice of proposed violation filed in Case No. 18-0395-PET.

The Intervenors assert that laying the pipe on the trench bottom violated the written specifications and, along with Vermont Gas's other substantial changes from the specifications, potentially affected the general good, system stability and reliability, and public safety.[38]

The Commission's adjudication of the Department's notice of proposed violation in Case No. 18-0395-PET was stayed pending the completion of Mr. Byrd's investigation. That investigation is now complete. Vermont Gas's failure to conform with the Project's trench bottom and trench breaker specifications has a potential for significant impact on public health and safety. Therefore, I find that Vermont Gas violated the 2013 Final Order, CPG, and Rule 5.408 by undertaking a substantial change to the Project without first receiving Commission approval as alleged in the Department's notice of proposed violation. My recommendation to the Commission regarding the stipulated penalty and remedial actions agreed to between the Department and Vermont Gas will be addressed in my proposal for decision on the appropriate penalty for the Commission to issue in this case and will reflect the factual findings above.

D. Failure to Comply with Compaction Requirements

71. Compaction is a measure of the density of the soil. After excavation, soils are generally loose and have relatively low compaction. The compaction can be increased by either adding or removing water from the soil, or by physically compressing the soil (as is done by a steamroller). Insufficient compaction of backfill around a pipeline can result in settling of soils within the trench (leading to an uneven surface and/or potholes) and frost heave (if the backfill contains too much water that then expands when frozen). These shortfalls can affect the surface of the right-of-way and are important to avoid, especially in areas that require a smooth surface over the pipeline (such as roads). Byrd Report at 40.

72. The 2013 Final Order and CPG required Vermont Gas to construct the pipeline in accordance with comprehensive written specifications. Findings 58-60, above.

73. The technical specifications issued by Vermont Gas to its contractors required compaction of all backfill and satisfaction of a compaction testing standard. 2014 Construction Manual at 476.

[38] Intervenors Proposed Facts at 25, 108.

74. Compaction to 95% of maximum dry density was required for trenches dug under pavement and roadways. 2014 Construction Manual at 476.

75. Compaction to 90% of maximum dry density was required for all other trenches. 2014 Construction Manual at 476.

76. The American Petroleum Institute's recommended practice is that backfill must be compacted to "densities consistent with that of the surrounding soil." Int. Cross Exh. 1 at 326.

77. There is no evidence that Vermont Gas compacted backfill as required in its specifications. This has a particularly adverse impact on roadways that cross the pipeline where a frost heave of the road may result. Byrd Report at 66-67; Liebert pf. reb. at 5; Jane Palmer Exh. 1, at note 8; LeForce Deposition at 161; tr. 9/1/20 at 68 (Byrd).

78. Contouring additional soil over the pipeline does not cure the failure to compact the backfill. Byrd Report at 67.

Discussion

The 2013 Final Order and CPG required Vermont Gas to meet or exceed the Federal Minimum Pipeline Safety Standards found at 49 C.F.R. Part 192. These minimum standards required Vermont Gas to (1) construct the pipeline in accordance with comprehensive written specifications; and (2) compact the soil to prevent an uneven surface above the pipeline and the potential for frost heave. Vermont Gas did not ensure that backfill was compacted and only conducted compaction testing in the Clay Plains Swamp after using the sink-in-the-swamp method to install the pipe there. Vermont Gas thus violated the 2013 Final Order and CPG by failing to compact backfill when using the regular open-trench installation of the pipeline.[39]

However, while backfill compaction is required by Federal Minimum Pipeline Safety Standards, there is no section of those regulations that mentions how to ensure compaction around transmission pipelines. Mr. Byrd opines that this is because the settling of backfill materials due to sub-optimal compaction does not pose a threat to high-strength welded-steel pipelines. Lack of compaction poses no danger to the pipeline itself. The steel and welded joints have more than adequate strength to resist earth settlement.[40]

[39] Compaction is irrelevant where the pipeline was installed using HDD.
[40] Byrd Report at 40.

The Intervenors assert that the Project, as constructed, rarely had compacted backfill and that compaction testing was rarely performed. According to the Intervenors, "This was a substantial and material change."[41]

Mr. Byrd believes that the requirements for sand and backfill compaction were overly conservative, but he agrees that their purpose was the protection of public safety at road and driveway crossings, and the protection of the natural environment in which the pipeline was constructed.[42] Mr. Byrd identified fifteen public road crossings, where lack of compaction and compaction testing may endanger the crossing.[43] That is, these deviations from what Vermont Gas promised in Docket 7970 have a potential impact on public health and safety and are a substantial change from the 2013 Final Order and CPG.

Vermont Gas acknowledges that the pipeline was not tested for compaction. Vermont Gas agrees to take appropriate remedial actions as recommended by Mr. Byrd, which include independent inspection and reporting regarding the fifteen pipeline locations beneath open-cut public roads.[44] Nonetheless the failure to observe compaction requirements remains a substantial change from, and thus a violation of, the 2013 Final Order, CPG, and Rule 5.408.

E. Failure to Staff the Project with a Vermont-Licensed Professional Engineer Serving as the Responsible Charge Engineer

79. In Docket 7970, Vermont Gas provided testimony that a licensed professional engineer was part of the team constructing the Project. Docket 7970 Tr. 9/17/13 at 63-63 (Heintz).

80. Vermont law governing the practice of professional engineering requires that a Vermont-licensed professional engineer supervise and take responsibility for the overall design of a potentially hazardous project such as a gas transmission pipeline. That engineer is known as the responsible charge engineer. The responsible charge engineer, upon satisfying himself or herself that all designs follow generally accepted engineering standards and applicable codes and adequately protect the public, is supposed to affix his or her seal and signature upon the issued-for-construction plans and specifications. Any subsequent substantial changes to the sealed and

[41] Intervenor Reply Brief at 13.
[42] *Id*. at, 66-67.
[43] *Id*. at 67, 73.
[44] Vermont Gas proposed facts at 62.

signed plans and specifications must be reviewed and commented on by that responsible charge engineer. Gregory Liebert, Intervenors ("Liebert") pf. at 3-6; Liebert Exh. 2 at 1-3, 6; Liebert pf. reb. at 5; Byrd Report at 19-20; 26 V.S.A. § 1161(2).

81. The plans that were issued for construction of the pipeline were not affixed with the signature and seal of a responsible charge engineer. St. Hilaire pf. at 16; Byrd Report at 62.

82. In 2012, Vermont Gas contracted for engineering services with Clough Harbor and Associates ("CHA"), a full-service engineering and consulting firm that provided continuous consultation and engineering services on the Project. St. Hilaire pf. at 6; Byrd Report at 16.

83. The plans that were issued for construction of the pipeline in 2013 were not sealed and signed by a Vermont-licensed professional engineer. In 2018, after the pipeline was constructed, these plans were signed and sealed by Michael Hollowood, a civil engineer from CHA, who had not yet been licensed in Vermont when the plans were issued on June 28, 2013. Liebert pf. at 3-4, Liebert Exh. 2 at 2.

84. Mr. Hollowood's 2018 signature and seal for the issued-for-construction plans were prompted by Vermont Gas's request that CHA provide documentation of a licensed engineer after the National Transportation Safety Board reported that the Merrimack Valley, Massachusetts, natural gas explosion and fires were caused in part by engineering plans that had not been signed and sealed by a professional engineer. Liebert Report of 9/12/19 at 2.

85. CHA states that Mr. Hollowood was in "responsible charge" of developing the plans issued for construction. Liebert Report of 9/12/19 at 2.

86. Invoices reveal that Mr. Hollowood spent only seven hours working on the Project when the plans for construction were issued. Caroline Engvall, Intervenors ("Engvall") pf. at 2.

87. Before the preparation of the issued-for-construction plans, in response to a complaint that non-licensed engineers were assisting in developing the Project's petition in Docket 7970, the licensing status of the engineering professionals then involved with the Project was investigated by the Vermont Office of Professional Responsibility. The 2013 investigation concluded that:

> [T]he Vermont-licensed respondent served as Principal-in-Charge of the Vermont project and remained meaningfully in responsible charge of those activities undertaken by other design-team members. Both unlicensed respondents under the Vermont Licensee's supervision were highly qualified by training, experience, and education; and each had attained licensure in a foreign jurisdiction. The Vermont

> licensee was actively engaged in the project and verified the subordinates' work; he did not act as a rubber stamp. The Vermont licensee directly supervised the preparation of design progress drawings and application materials.

2014 OPR Report at 2; Byrd Report at 20, 63; Liebert pf. at 5.

88. The pipeline safety regulations in Vermont and at the federal level do not contain any requirements for professional engineering certification of plans and specifications. This matter is left up to the state professional engineering regulatory bodies (in this case, the Vermont Secretary of State, Office of Professional Regulation). Byrd Report at 19.

89. CHA was required by contract to perform its pipeline work in compliance with "all applicable laws, statutes, ordinances, rules, regulations and orders enacted by or promulgated by federal, state, municipal or other governmental authority." St. Hilaire pf. at 16; exh. VGS-JSH-5 at 17-18.

90. CHA states that all its engineering work, including the plans used to construct the pipeline, were in fact appropriately overseen by Vermont-licensed professional engineers. St. Hilaire pf. at 16; exh. VGS-JSH-4.

91. Organizationally, Vermont Gas managed the construction of the Project using a construction management team. The construction management team evolved over time, although core members of the team were consistent. In 2014, Christopher LeForce, a Vermont Gas employee, was the engineering manager, and CHA was the Project engineer. In 2015, Vermont Gas brought Hatch Mott McDonald ("HMM") aboard to serve as a "Third Party Technical Engineer" and retained CHA as the "Engineer of Record"– both reporting to Mr. LeForce. Vermont Gas also hired an environmental consultant, Vanasse Hangen Brustlin, Inc., and a corrosion prevention consultant, ARK Engineering & Technical Services, Inc. These consultants advised the construction management team by providing subject matter technical reports and design guidance. Byrd Report at 19 and Att. 30 and 31.

92. Pursuant to Vermont Gas's construction specifications, the construction management team was responsible for exercising oversight and providing direction during the Project's construction. Byrd Report at 19.

93. Section 312333 of the specifications issued to CHA, as the "Engineer of Record," states that the construction management team can make final decisions concerning:

- the suitability of materials that are to be used, specifically for select backfill/pipe padding; and general backfill,
- the suitability of the trench bottom "for properly placing select backfill/padding material and laying pipe,"
- the point of discharge for de-watering operations,
- the bracing/protection system for pipe prior to completion,
- pipe supports prior to backfilling,
- methods of bedding the trench bottom,
- the skids and protective padding materials to be used during pipe stringing,
- the pipe bending machine and methods; and suitability of pipe after bending,
- equipment spacing used for pipe lowering-in operations,
- additional jeeping[45] of the pipe coating prior to lowering-in,
- location and type of rock shield,
- suitability of drain tile repairs,
- placement of backfill against structures, and
- additional testing on backfill.

Byrd Report at 19.

94. The Vermont Gas construction management team did not designate a "responsible charge engineer" to oversee engineering practices during pipeline construction. There was no "responsible charge engineer" who signed and sealed plans intended for use during construction. There was no "responsible charge engineer" that reviewed and commented on deviations from the construction plans. Liebert pf. at 3,5; Byrd Report at 20.

95. The Project's quality assurance plan was overseen by the construction management team rather than a licensed responsible charge engineer. Liebert Report of 9/12/19 at 2.

[45] "Jeeping" is a final comprehensive coatings inspection of the pipeline done immediately before it is lowered into the trench. Byrd Report at 31.

Discussion

Vermont Gas argues that it complied with the 2013 Final Order and CPG and constructed the pipeline consistent with the plans and evidence, which provided that the pipeline would be "designed and will be constructed and operated to meet or exceed all applicable state and federal codes and standards."[46]

> The pipeline was designed by CHA, which is a highly competent full-service engineering and consulting firm. CHA provided continuous consultation and engineering services on the Project. The Project was thoroughly and competently designed and engineered using modern equipment and technology, and constructed in accordance with CHA's sound engineering practices, design, and final plans – to a higher standard than required by pipeline safety code. There is no evidence of any inadequacy in the design and engineering of the ANGP. There is also no evidence calling into question CHA's qualifications or engineering expertise.[47]

While CHA may have served as the Project's engineer, there is no evidence that this organizational practice conformed to the Vermont Office of Professional Responsibilities' rules that called for a "responsible charge engineer." Mr. Byrd asserts that CHA did a professional engineering job. Nonetheless, CHA, for Vermont Gas, did so without being responsive to the rules overseeing the delivery of licensed professional engineering services in the State of Vermont.

Mr. Liebert, who served as the Intervenors' engineering expert in this proceeding, opines that:

> The purpose of the generally accepted engineering practices summarized above and the requirements for a responsible Vermont-licensed engineer to sign and seal plans and specifications is to protect the public. The failure to follow these practices, in my view, compels the conclusion the [Project] was constructed in a manner that does not adequately protect the public.[48]

In response, Mr. Byrd, the independent third-party investigator, opined that:

> I have not seen or heard of any specific reason that the relevant plans were not stamped by a Vermont [professional engineer] prior to construction. The Vermont [professional engineer] regulations allow for electronic stamps and signatures (not just physical stamps and signatures), so there may have simply been a misunderstanding about work products having been officially stamped or not. While the letter of the professional engineering requirements in the State of

[46] 2013 Final Order Finding 259.
[47] Vermont Gas Proposed Facts at 38.
[48] Liebert Report of 9/12/19 at 6.

> Vermont was arguably not met in this instance, the spirit clearly was. I have seen no evidence that the engineering or design work for the Project was deficient, was not performed by competent engineers, or posed a risk to "public health, safety, and welfare."[49]

Mr. Byrd thus observes that the state standards for professional engineers was simply not part of Vermont Gas's corporate culture during the construction of the pipeline.

The Department differs with Mr. Byrd, and concludes that:

> [Vermont Gas] has effectively mitigated the failure to follow the letter of the law by credibly confirming the project is based on comprehensive and technically sound design, construction, and quality assurance. Nonetheless, sophisticated businesses such as rate-regulated utilities have a duty to conduct themselves in a manner that is above reproach, which includes ensuring their consultants and contractors abide both in letter and spirit by the clear standards of professionalism that are prescribed by law. [Vermont Gas]'s conduct simply was not above reproach in this case.
>
> [Vermont Gas] failed to observe the letter of the law, and thus failed to live up to its commitment to exceed applicable state standards as the company, in fact, did not ensure the [intended-for-construction] plans relied upon in the construction of the pipeline were properly signed and sealed by the responsible engineer prior to construction, as required under state law.[50]

My conclusion is that, by failing to observe the standards required of professional engineers by the State of Vermont, Vermont Gas did not comply with the 2013 Final Order and CPG. Mr. Byrd asserts that Vermont Gas somehow mitigated the formal "signed-and-sealed" requirement by otherwise doing competent engineering work that met the high standard required by the 2013 Final Order and CPG. I disagree with Mr. Byrd. Vermont Gas's failure to observe the standard was more than a formalistic deviation; it was a substantial change from a requirement of the 2013 Final Order and CPG that may have contributed to the engineering deviation in the swamp discussed above.

Vermont Gas is liable for failing to observe the state standards for professional engineers because that failure had the potential to have a significant impact under the Section 248 criteria addressed in the violations discussed above.

When confronted by the need to deviate from the open-trench burial method addressed in the 2013 Final Order, Mr. Bubolz contacted the construction management team but did not seek

[49] Byrd Report at 64.
[50] Department Brief of 10/2/20 at 8.

the permission of the "responsible charge engineer" before using the sink-in-the-swamp installation. In fact, the position of responsible charge engineer did not exist in Vermont Gas's organization of the Project. Therefore, there was no review or approval by a responsible charge engineer of a deviation from the approved plans and specifications before the sink-in-the-swamp method was used in the Clay Plains Swamp. There was a questionable after-the-fact review and "approval" by VELCO relying inaccurately on engineering standards. But there was no review by a responsible charge engineer before Vermont Gas committed to allowing the pipeline to sink in the swamp. As discussed above, this deviation from the 2013 Final Order and CPG was a substantial change with the potential for a significant impact under the Section 248 criteria.

Vermont Gas argues that the 2013 Final Order and CPG do not require a professional engineer to certify the plans and specifications for the Project or designate a responsible charge engineer.[51] I disagree because the 2013 Final Order required Vermont Gas to use a licensed engineer.[52]

Vermont Gas contends that:

> The issue of whether the [Project] plans were stamped as contemplated under Title 26 was raised in this proceeding by [the] Intervenors following a report issued in 2018 by the National Transportation Safety Board ("NTSB"). That report recommended that all states require stamped plans by licensed [professional engineers] in the wake of the Columbia Gas incident. It also recommended that utilities incorporate review of engineering plans for a stamp as part of their constructability review process. VGS's consideration and adoption of the NTSB's 2018 recommendations, where appropriate, on a prospective basis reflects sound and responsible utility practice.[53]

Vermont Gas states that it is now "prospectively" applying the NTSB's recommendation that "utilities incorporate review of engineering plans for a stamp as part of their constructability review process." This statement fails to reflect the fact that this requirement already existed in Vermont before the disastrous events that occurred in the Merrimack Valley. The NTSB's report recommends that Massachusetts, which did not previously have a "signed-and-sealed" requirement, institute this standard just as Vermont and many other states already had.[54]

[51] Vermont Gas Proposed Facts at 39-40.
[52] Finding 79, above.
[53] *Id*. at 40.
[54] NTSB Report at 3-4.

I find Vermont Gas liable for continuously failing to require that its engineers observe the standards for licensed professional engineers established by statute and Vermont's Office of Professional Responsibility. The Office of Professional Responsibility is responsible for enforcing those standards on engineers. The Commission is responsible for addressing Vermont Gas's compliance with the 2013 Final Order and CPG.

This is a substantial change from what was testified to by Vermont Gas and ordered in the 2013 Final Order and CPG. Therefore, I find Vermont Gas liable for failing to observe the state standards for professional engineers and will address an appropriate remedy for this failure in my penalty recommendation to the Commission.

VII. FINDINGS OF A MATERIAL DEVIATION

Failure to Bury the Pipeline Seven Feet Below Non-Jurisdictional Streams

96. Portions of the Project needed to be in the vicinity of streams. However, the natural condition of the streams was to be maintained. The Project crossed 17 unique streams or rivers at 22 discrete locations. 2013 Final Order Finding 368.

97. These 22 stream-crossing locations were mapped by ANR. Watershed sizes greater than one square mile are "jurisdictional" and are subject to review and comment by ANR personnel. The pipeline also crosses several smaller brooks, streams, and riparian buffer zones. These are "non-jurisdictional" streams. 2013 Final Order, Findings 368-371.

98. To ensure that the pipeline did not have an adverse impact on any streams and to meet ANR permitting requirements, Vermont Gas committed to burying the pipeline seven feet beneath all open-cut streams, without distinguishing between jurisdictional and non-jurisdictional streams. 2013 Final Order Finding 62(e).

99. ANR conducted a review of Vermont Gas's burial depth data to determine whether Vermont Gas violated any ANR permitting requirements. ANR found that Vermont Gas deviated from the 2013 Final Order and CPG by failing to bury the pipeline seven feet below eight non-jurisdictional streams. ANR stated that it decided not to pursue enforcement under its independent enforcement authority because of the immaterial nature of this non-compliance, which arose from a technical detail that is not relevant to the stormwater permit's programmatic

purpose of managing surficial discharges of stormwater from construction activities. Byrd Report, Att. 64.

100. ANR also concluded that the failure to bury the pipeline with a seven-foot depth-of-cover below non-jurisdictional streams resulted in non-compliance with two ANR permits, one for water quality certification and one for stormwater discharge. However, ANR concluded that the non-compliance did not result in any harm to the natural environment and was not material in the context of those permits. Byrd Report, Att. 64.

Discussion

The 2013 Final Order set a seven-foot burial depth standard for all open-cut streams, both jurisdictional and non-jurisdictional. ANR has concluded that Vermont Gas met the burial depth requirement at jurisdictional streams, but that Vermont Gas failed to achieve a seven-foot burial depth at eight non-jurisdictional streams and therefore contends Vermont Gas is in violation of the 2013 Final Order.[55] However, ANR also concluded that this violation of the 2013 Final Order and CPG results in no significant impact and is immaterial to the Project's Individual Construction Stormwater Discharge Permit and 401 Water Quality Certification.[56]

In his review of ANR's comments regarding Vermont Gas's failure to achieve the seven-foot depth-of-cover standard at non-jurisdictional streams, Mr. Byrd disagreed with ANR's interpretation that this standard was required but agreed that any violation would be purely of a technical nature with no impacts on pipeline safety or the environment.[57]

The Department agrees with ANR's contention that Vermont Gas's failure to meet the seven-foot depth-of-cover requirement for all open cut streams is a violation of the 2013 Final Order. I agree with the Department and ANR.

The Commission relied upon the representations of Vermont Gas to ensure a specific depth-of-cover for open-cut streams, and that requirement was not met at several non-jurisdictional stream crossings. Vermont Gas did not seek a non-substantial change determination or a CPG amendment from the Commission to deviate from that burial depth at non-jurisdictional stream crossings.

[55] Byrd Report, Att. 64. "Non-jurisdictional" streams are not jurisdictional because they are not subject to an ANR stream alteration permit and water quality certification, but these same, smaller streams are subject to ANR's construction stormwater discharge permit for the Project.

[56] Department Brief at 6.

[57] Byrd Report at 68.

While Vermont Gas did not comply with the burial-depth requirement for non-jurisdictional streams, this presents no potential for significant impact as noted in the Byrd Report and by ANR and therefore does not require a CPG amendment under Rule 5.408. Nonetheless, the deviation from the original requirement to achieve the seven-foot depth standard for non-jurisdictional streams in several instances constitutes a broad alteration to the Project, and thus is a material deviation from the plans and evidence approved in Docket 7970 that required Commission approval.[58] Vermont Gas's failure to obtain the approval before implementing this material deviation was therefore a violation of the 2013 Final Order and CPG.

VIII. FINDINGS NOT RESULTING IN LIABILITY

A. Corrosion Protection

101. Several miles of the pipeline are in or adjacent to a VELCO right-of-way that contains high-voltage overhead electrical lines. These types of electrical lines can create stray electrical currents in the ground surrounding the pipeline that interfere with the cathodic protection current protecting the pipeline from corrosion. Electrical transmission systems use alternating current ("AC") while cathodic protection systems use direct current ("DC"), and it is possible to isolate the beneficial DC current from the potentially harmful stray AC current. This is called AC mitigation. Byrd Report at 26.

102. The Project design called for zinc ribbon to be buried between the pipeline and the VELCO electrical transmission lines in specified locations and connected to the pipeline using solid state decouplers. Byrd Report at 26.

103. Inspection readings from the solid state decouplers installed on the pipeline indicated that the AC mitigation was properly installed and functioning. Byrd Report at 26 and Att. 30.

104. As required by 49 C.F.R. § 192.455(a)(2), the pipeline had a cathodic protection system designed to protect the pipeline and placed in operation within one year after completion of pipeline construction. Byrd Report at 71.

[58] Case No. 19-3031-PET, Order of 3/19/20 at 7-9.

105. Corrosion protection systems are typically installed after most of a pipeline is constructed. Once a corrosion protection system is installed it is tested and the results documented. The pipeline's corrosion protection system, which includes pipeline coatings, was surveyed by Mr. Byrd and found to be "in excellent condition." Byrd Report at 63, 66, and 71; 49 C.F.R. 192.455.

106. The pipeline was constructed from pipe with modern factory-applied coatings and applicable specifications. Byrd Report at 70; St. Hilaire pf. at 8.

107. Field-applied coatings were applied by qualified personnel and under a comprehensive inspection program. Byrd Report at 70.

108. Vermont Gas conducted and documented detailed inspections of a sampling of locations during field-applied coatings. That was consistent with industry practice and regulatory requirements. Byrd Report at 30.

109. The entire length of the pipeline was inspected at least twice by "jeeping" to ensure that there were no defects in the coating prior to burial. Byrd Report at 70-71; St. Hilaire pf. at 8.

110. Comprehensive cathodic protection surveys and Mr. Byrd's pipe-to-soil readings, which compare the difference in voltage between the steel and the surrounding earth, indicate that the cathodic protection for the pipeline is excellent. Byrd Report at 24, 71.

Discussion

The pipeline designs and specifications required zinc ribbon to be buried between the pipeline and the VELCO electrical transmission lines in specified locations.[59] As indicated in the Byrd Report, installation of the zinc ribbon in designated locations was confirmed to be in compliance with the appropriate specifications. The Department and the Intervenors do not dispute these findings.[60]

Accordingly, I find that Vermont Gas complied with the 2013 Final Order and CPG by installing an adequate corrosion protection system that includes an AC mitigation system.

[59] Byrd Attachment #30 at 36.
[60] Department Brief at 9; Intervenors Reply Brief at 1-2.

B. Backfill

111. Backfill is the material used to fill up the trench and consists of several distinct layers. "Select backfill" is used closest in proximity to the pipe and is specified so that it does not damage the pipe or coating. "General backfill" is used to fill the remainder of the trench. Last, topsoils, which are segregated at the start of the excavation process, are returned to the top layer of the trench at the end of backfilling. Byrd Report at 33.

112. The typical method for installing a transmission pipeline with trenching is:

(a) the trench is excavated,

(b) the soil is put to one side of the trench,

(c) on the other side of the trench, the pipe is welded together outside of the trench,

(d) sandbag supports are placed in the trench to ensure the proper amount of clearance between the pipe and the bottom of the trench,

(e) the pipe is lifted up and placed in the trench on top of the sandbags, and

(g) the trench is backfilled.

Tr. 9/2/20 at 116-17 (Byrd).

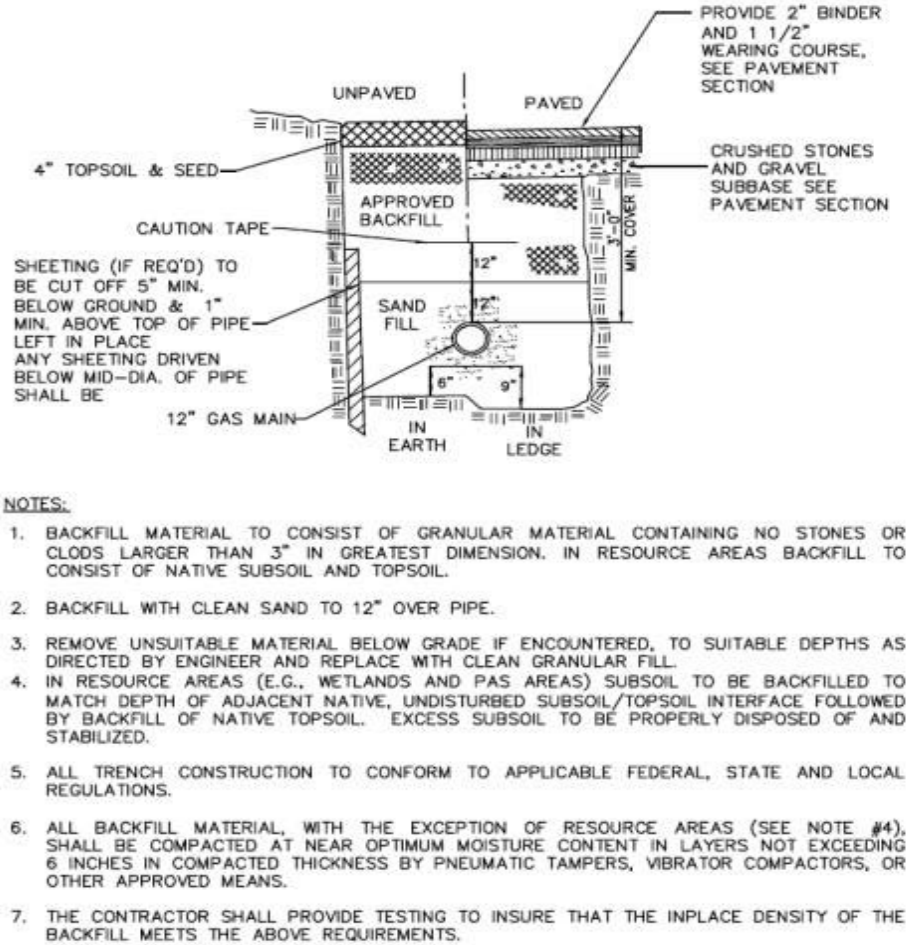
113. The plans and evidence submitted by Vermont Gas indicated that in wetlands and agricultural areas, where trenches are used, soil horizons would be removed in order and stockpiled so that horizons could be restored as closely as possible to pre-construction conditions. Heintz pf. at 15; Heintz supp. pf. at 20; 2013 Final Order at Finding 68.

114. Suitable backfill material does not interfere with the cathodic protection system or cause damage to the coating on the pipeline. Screened and padded backfill or washed sand was to be used especially in areas where the native soils contain rock or is made up of rock ledges. 2013 Final Order Finding 270; Docket 7970 Berger pf. reb. at 8.

115. Vermont Gas's narrative specification Section 13.i, which set standards for Vermont Gas's subcontractors to observe while working on the pipeline, stated that select fill material and/or padding material shall be sand in accordance with VTrans Standard Specification 703.03 or shall be screened native material containing silts, sands, and gravels with the largest material being no larger than 1-inch on the longest dimension. Byrd Report at 64-65.

116. Figure 2, below, which is from the Project's design specifications, includes notes that set standards for installing the pipeline in an open-cut trench. For example, the Typical

Trench Detail required that the uppermost area consist of "4 inches topsoil & seed" and "backfill with clean sand to 12" over pipe." Docket 7970 Exh. Pet. JH-3.



NOTES:

1. BACKFILL MATERIAL TO CONSIST OF GRANULAR MATERIAL CONTAINING NO STONES OR CLODS LARGER THAN 3" IN GREATEST DIMENSION. IN RESOURCE AREAS BACKFILL TO CONSIST OF NATIVE SUBSOIL AND TOPSOIL.
2. BACKFILL WITH CLEAN SAND TO 12" OVER PIPE.
3. REMOVE UNSUITABLE MATERIAL BELOW GRADE IF ENCOUNTERED, TO SUITABLE DEPTHS AS DIRECTED BY ENGINEER AND REPLACE WITH CLEAN GRANULAR FILL.
4. IN RESOURCE AREAS (E.G., WETLANDS AND PAS AREAS) SUBSOIL TO BE BACKFILLED TO MATCH DEPTH OF ADJACENT NATIVE, UNDISTURBED SUBSOIL/TOPSOIL INTERFACE FOLLOWED BY BACKFILL OF NATIVE TOPSOIL. EXCESS SUBSOIL TO BE PROPERLY DISPOSED OF AND STABILIZED.
5. ALL TRENCH CONSTRUCTION TO CONFORM TO APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.
6. ALL BACKFILL MATERIAL, WITH THE EXCEPTION OF RESOURCE AREAS (SEE NOTE #4), SHALL BE COMPACTED AT NEAR OPTIMUM MOISTURE CONTENT IN LAYERS NOT EXCEEDING 6 INCHES IN COMPACTED THICKNESS BY PNEUMATIC TAMPERS, VIBRATOR COMPACTORS, OR OTHER APPROVED MEANS.
7. THE CONTRACTOR SHALL PROVIDE TESTING TO INSURE THAT THE INPLACE DENSITY OF THE BACKFILL MEETS THE ABOVE REQUIREMENTS.

Figure 2. Typical Trench Detail

117. CHA specification 312000, section 3.5 Fill, says that when native soil conditions are not acceptable for pipe bedding and pipe envelope backfill, "bank run sand" shall be utilized. Byrd Report at 65.

118. The pipeline was typically not installed by backfilling with sand to a height 12 inches above the pipeline. LaForce Deposition at 160.

119. The Project used select backfill to bed and pad the pipe. Clean sand was only imported and used when the native materials were unacceptable. Byrd Report at 65.

120. None of the inspection reports addressed whether the backfill was screened for rocks of any size. Jane Palmer, Intervenors ("Palmer") pf. at 2; Palmer exh. 1, note 6.

121. The construction specifications required that pipeline bedding and backfilling be accomplished in three stages. The first stage was to include placement of "pipe zone bedding" as a layer of selected material to provide support, or to stabilize unsound or unsatisfactory foundation conditions. The second stage would involve placement of "pipe-zone backfill" from the top of the bedding material up to one foot above the pipe. The third stage would involve the placement of "trench backfill" in the remainder of the trench up to the surface of the ground or the bottom of any special surface treatment subgrade elevation. 2014 Construction Manual at 493.

122. These burial specifications comply with 49 C.F.R. § 192.319, which requires that, when a trench for a transmission line or main is backfilled, it must be backfilled in a manner that provides firm support under the pipe and prevents damage to the pipe and pipe coating from equipment or from the backfill material. Byrd Report at 35-36.

123. The specifications allowed the use of acceptable native soil for bedding and backfill. Byrd Report at 65.

124. The Project used backfill to bed the pipe. That backfill normally came from the excavated materials, as is common in the industry. Byrd Report at 65.

125. The limited use of clean sand differs from what is shown in Figure 2, Typical Trench Detail, above. This diagram calls for the use of backfilling with clean sand up to 12 inches above the pipeline. Docket 7970 Exh. Pet. JH-3.

126. The native backfill used for bedding and padding the pipe was of sufficient quality. Byrd Report at 65.

127. Mr. Byrd opined that typical trench detail using a bed of sand is not a common procedure for installing a transmission pipeline. Tr. 9/2/20 at 116-118 (Byrd).

128. The industry standard for "clean sand" is for backfill material screened of rocks that would damage a pipeline's coatings. Tr. 9/2/20 at 55 (Byrd).

129. Clean sand means any finely grained material. The more precise term is "select backfill," but for purposes of the pipeline specifications, clean sand and select backfill material are synonymous terms. Tr. 9/2/20 at 55-57 (Byrd).

Discussion

Despite the Typical Trench Detail shown in Figure 2, which calls for clean sand, the use of native soil for bedding and backfill was routine during Project construction pursuant to the Vermont Gas and CHA specifications.[61] The use of select native backfill from excavated materials is common in the industry, and clean sand was imported and used when the native materials were unacceptable. The Department does not dispute the Byrd Report's findings that the backfill used for bedding and padding the pipe was sufficient in quality and not in violation of the written specifications and standards for the pipeline.[62]

The Intervenors contend that the use of native soils as select backfill was not approved by the construction management team or a responsible charge engineer before its routine use. They assert that, even if clean sand and select backfill are synonymous, in the absence of this approval, clean sand was required.[63]

In his deposition, Mr. Bubolz testified that he was responsible for the backfilling and padding of the pipeline as it was installed. Mr. Bubolz also testified that he defined "backfill" as material that was excavated that would be returned to the trench after the pipe was installed. He defined "padding" as backfill material that was free of rocks. He said that when a crew of his was backfilling a trench, the "third-party" construction inspector would approve the use of native material as backfill and padding. Mr. Bubolz also indicated that, whenever he was at the site, he would also do a visual inspection of the material to be used as backfill before it was placed in the trench. If he was not present, the site foreman and third-party inspector would visually inspect the backfill material.[64]

The Intervenors argue that the operating procedures in the 2014 Construction Manual required six inches of padding beneath the pipeline.

Mr. Byrd testified that the requirement of padding beneath the pipe did not apply to the type of pipe installed by Vermont Gas. He suggested that the requirement was mistakenly borrowed from bell-and-spigot water pipeline construction, where the pipe has a female "bell" and is coupled with the male end of the section of pipe to be inserted. The padding required in

[61] Byrd Report at 64-65.
[62] Department Brief at 10.
[63] Intervenors Proposed Findings at 84 and 112.
[64] Bubolz Deposition at 19-23.

this bell-and-spigot circumstance compensates for the differences in pipeline circumference along the base of a bell-and-spigot water pipe. That is, the bell feature expands the circumference of the pipe. This keeps a bell-and-spigot water pipeline from crimping and retracting from the bell. The padding that lifts the bell-and-spigot water pipeline is placed along the pipeline between the bell couplings. The gas pipeline installed by Vermont Gas does not have bells because the pipe is welded to tie the pieces of pipe together, with the ends of each section of pipe having the same circumference.[65]

The allegation that padding was required beneath the pipe is misplaced and reflects the unnecessary application of a standard that was inapplicable to a natural gas pipeline.

Mr. Byrd's investigative findings demonstrate that Vermont Gas did use select backfill and that it was of sufficient quality, having been visually approved by the on-site foreman and third-party construction inspector. Accordingly, I find that backfill used on the pipeline was not a material deviation from the plans or the evidence and that no violation resulted from its use.

C. General Pipeline Depth of Cover

130. Based on his field investigation of the burial depth of the pipeline outside the Clay Plains Swamp, Mr. Byrd concluded that the measurements and depth-of-cover data filed by Vermont Gas were accurate as of the date submitted and there was no need to re-survey the depth-of-cover for the entire pipeline. Byrd Report at 69.

131. As part of its petition in Docket 7970, Vermont Gas filed the testimony of Mr. Heintz, who stated that the "pipeline will have four feet of cover … in residential areas." Docket 7970 Heintz pf. 2/28/13 at 32.

132. Referring to Mr. Heintz's testimony, Mr. Byrd concluded that because the burial depths for agricultural areas, the VELCO right-of-way, road crossings, and stream crossings, but not residential areas, were reduced to specific findings in the 2013 Final Order, it was reasonable to conclude that the Commission did not set a four-foot depth-of-cover requirement for residential areas in the 2013 Final Order. Byrd Report at 69; 2013 Final Order, Finding 62.

[65] Tr. 9/1/20 at 49 and 54 (Byrd).

Discussion

During the application and review process, Vermont Gas committed to install the entire pipeline with a three-foot depth-of-cover unless otherwise specified.[66] The Intervenors argue that the required depth-of-cover in residential areas should have been four feet because in Docket 7970 there was testimony from Vermont Gas that the burial depth in residential areas was to be four feet. This testimony was not reflected in the findings or discussion in Docket 7970. The Department agrees with Mr. Byrd that the standard in residential areas is three feet because, despite the testimony, the four-foot "depth-of-cover requirement for residential areas was subsequently not included in the Commission's Final Order."[67]

I agree with the Department and Mr. Byrd that there was no four-foot burial depth requirement in residential areas because the findings in Docket 7970 do not call for a four-foot depth-of-cover in residential areas.

To confirm Vermont Gas's compliance with the three-foot depth-of-cover requirement, Vermont Gas conducted top-of-pipe readings at the time of installation and depth-of-cover readings after the final grade was achieved.[68] Based on these readings, Vermont Gas concluded that with the notable exception of the pipeline in the Clay Plains Swamp addressed above, "more than 95% of the pipeline was installed to a depth of at least 4 feet" and "[t]he entire ANGP pipeline was installed at least 36 inches underground at every one of the more than 4,500 welds along its 41-mile length."[69] The Byrd Report confirmed that Vermont Gas met the minimum regulatory requirements, including the burial of the pipeline at a minimum depth of three feet for most of the pipeline.[70]

Mr. Byrd reviewed Vermont Gas's depth-of-cover certification, conducted depth-of-cover tests in the field, and concluded that Vermont Gas's certification of the general three-foot depth-of-cover standard was accurate in those areas where it was applicable. As discussed above, the four-foot depth-of-cover standard and in some places the three-foot depth-of-cover

[66] Berger pf. at 6. Finding 8, above, mirrors Finding 62 of the 2017 Final Order and states: "The pipe will be covered by at least 36 inches of soil. The pipeline will have four feet of cover in agricultural areas and within the VELCO ROW, generally five feet of cover at road crossings, and seven feet of cover at open-cut streams."
[67] Department Brief at 5.
[68] St. Hilaire Affidavit at 2, ¶ 4 (Aug. 11, 2017).
[69] Id. at 2, ¶ 5-6.
[70] Byrd Report at 51.

were not met in the Clay Plains Swamp, and the seven-foot depth-of-cover standard was not achieved at eight non-jurisdictional stream crossings.

The Department does not dispute the conclusion that Vermont Gas met the general depth-of-cover commitment of three feet for most of the length of the pipeline.[71] The significant exception is within the Clay Plains Swamp, where Vermont Gas acknowledges the pipeline does not meet either the three-foot or four-foot standard, as discussed above.

Early in this proceeding the Intervenors questioned Vermont Gas's certification of the depth-of-cover.[72] They do not, however, challenge Vermont Gas's conclusion now that there is no need to re-survey the depth-of-cover for the entire pipeline.[73] I agree and find that there was no violation of the general three-foot depth-of-cover standard.

D. Quality Assurance

133. The construction of the pipeline was to be done under a quality assurance plan that addressed pipe inspection, hauling and stringing, field bending, welding, non-destructive examination of girth welds, applying and testing field-applied coating, lowering of the pipeline into the trench, padding and backfilling, and hydrostatic testing. 2013 Final Order Finding 264.

134. On November 1, 2017, the American Petroleum Institute ("API") issued the first edition of API RP 1177: Recommended Practice for Steel Pipeline Construction Quality Management Systems, First Edition. This pipeline industry guidance for quality management, of which quality assurance is an element, was not available in 2013 when the Project was approved. Byrd Report at 27.

135. A quality assurance plan to be implemented through inspection requirements was incorporated into the Project specifications before construction. Byrd Report at 27-28 and Att. 17.

136. Project inspection activity generally conformed with API RP 1169: Recommended Practice for Basic Inspection Requirements−New Pipeline Construction. Byrd Report at 64.

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[71] Department Brief at 5.

[72] Intervenors' Reply to Vermont Gas's Request for a 6th Non-Substantial Change Determination and Request for an Investigation, 6/27/17, at 7.

[73] Vermont Gas Proposed Facts at proposed finding 201. The Intervenors do, however, question Vermont Gas proposed finding 200 that there is no regulatory requirement that the original depth-of-cover be maintained. Intervenors Reply Brief at 8.

137. Vermont Gas prepared inspection manuals for pipeline construction activities and updated them annually. These manuals included inspection protocols for all construction activities, forms, and other reference materials for inspectors. Byrd Report at 28 and Att. 35.

138. Through third-party contractors, Vermont Gas hired a variety of inspectors trained in different specialties (e.g., welding and coating) to conduct the inspection activity required by the Project's specifications. Byrd Report at 28.

139. Extensive specifications were prepared in advance of construction, and inspections were performed by multiple parties to ensure conformance with those specifications with contemporaneous reporting to the construction management team. The construction management team was well defined and actively involved in the oversight of construction. In this way Vermont Gas addressed construction quality issues. Non-compliance was corrected or properly managed as it was identified through inspection. In this way, Vermont Gas developed and used a quality assurance program to oversee the pipeline contractor and subcontractors. Don Rendall, Vermont Gas ("Rendall") pf. at 8; Byrd Report at 64.

Discussion

Finding 264 of the 2013 Final Order required that Vermont Gas construct a pipeline using a quality assurance plan. In their February 12, 2018, motion to broaden the scope of the investigation, the Intervenors alleged that no quality assurance plan was in effect in 2014 and observed that in February 2015 the Department was concerned that the quality assurance plan lacked critical elements.[74]

The Commission expanded the scope of Mr. Byrd's investigation to review these allegations. Mr. Byrd investigated Vermont Gas's quality assurance process and concluded that this allegation was not supported by the evidence: "Vermont Gas appropriately developed and complied with a Quality Assurance program to oversee the pipeline contractor and subcontractors." Based on Mr. Byrd's review of Vermont Gas's implementation of a quality assurance program and inspection process, I find that Vermont Gas complied with the limited standard set out in Finding 264 of the 2013 Final Order.

[74] Intervenors' Motion to Broaden Scope of Investigation, filed 2/28/18, at 31.

Unlike the allegations for which I found Vermont Gas liable above, the lack-of-quality-control allegation is not based on an instance of over-promising but underdelivering. Vermont Gas hired various inspectors with different skills to observe and report on construction activities. This conformed to the industry standard. As required by Finding 264 of the 2013 Final Order, Vermont Gas did have a process for assessing pipe inspection, hauling and stringing, field bending, welding, non-destructive examination of girth welds, applying and testing field-applied coating, lowering of the pipeline into the trench, padding and backfilling, and hydrostatic testing.

Quality assurance has been broadly defined as "part of quality management focused on providing confidence that quality requirements will be fulfilled."[75] The confidence provided by quality assurance is twofold − internally to management and externally to customers, government agencies, regulators, certifiers, and third parties. An alternate definition is "all the planned and systematic activities implemented within the quality system that can be demonstrated to provide confidence that a product or service will fulfill requirements for quality."[76]

While I do not find Vermont Gas liable for failing to meet the standard for a quality assurance program set out in the 2013 Final Order, I must conclude that Vermont Gas did not have the internal expertise during construction to meet the current industry standard for developing and overseeing a quality assurance program for pipeline construction. As a consequence, this proceeding required a third-party investigator to ferret out facts that should have been readily available to both internal and external parties before this investigation began, at a substantial and growing cost to Vermont Gas and its shareholders.

Vermont Gas knew how to and did conduct adequate inspection of the construction of its pipeline. Vermont Gas achieved that part of quality assurance. Vermont Gas has not, however, shown that it knows how to document "all the planned and systematic activities implemented within the quality system that can be demonstrated to provide confidence that a product or service will fulfill requirements for quality." This resulted in a three-plus year investigation.

I do not, however, find that this shortfall amounts to a substantial change or a material deviation from the 2013 Final Order and CPG. It is nonetheless a current organizational shortfall that Vermont Gas will be expected to overcome in the future.

[75] *See ISO 9000:2015 Quality Management Systems – Fundamentals and Vocabulary.*
[76] *Id.*

IX. CONCLUSION AND ORDER

Based on the above findings of fact and conclusions of law, I conclude that Vermont Gas is liable for having failed to meet the standards and requirements set in the 2013 Final Order, the CPG, and in some instances Commission Rule 5.408. Vermont Gas did not build the Project as approved. Specifically, Vermont Gas failed to:

(1) bury the pipeline using the burial methods approved in the 2013 Final Order and CPG;

(2) achieve the four-foot depth-of-cover standard required at 18 locations in Clay Plains Swamp;

(3) conform to its own specifications regarding pipeline burial on the trench bottom and installation of trench breakers;

(4) comply with the compaction requirements for the pipeline in its construction specifications;

(5) ensure that staffing for the Project included a licensed professional engineer that served as the responsible charge engineer for the Project.

I find that these five failures are substantial changes from the 2013 Final Order and CPG with the potential for significant impact under the applicable criteria of Section 248.

Vermont Gas also failed to bury the pipeline seven feet below eight non-jurisdictional streams. I conclude that this is a material deviation from the Project standards.

With the issuance of this Order, it is now appropriate to move forward with the penalty phase of this investigation as recommended by the Department. The penalty phase will result in a proposal for decision that will make recommendations about any proposed penalties appropriate in Case No. 17-3550-INV and Case No. 18-0395-PET, and whether Vermont Gas must seek an amendment to the CPG issued for the Project in Docket 7970.

The parties shall submit scheduling proposals for additional proceedings to determine the appropriate penalty for the five substantial changes and the material deviation described above. The penalty phase of this proceeding will also address a recommendation as to whether any additional remedies are appropriate. Schedule proposals for the penalty phase shall be submitted no later than February 19, 2021.

SO ORDERED.

Dated at Montpelier, Vermont, this 29th day of January, 2021.

Michael E. Tousley, Esq.
Hearing Officer

OFFICE OF THE CLERK

Filed: January 29, 2021

Attest: _____
Deputy Clerk of the Commission

Notice to Readers: This decision is subject to revision of technical errors. Readers are requested to notify the Clerk of the Commission (by e-mail, telephone, or in writing) of any apparent errors, in order that any necessary corrections may be made. (E-mail address: puc.clerk@vermont.gov)

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